



ANNUAL REPORT

OF THE

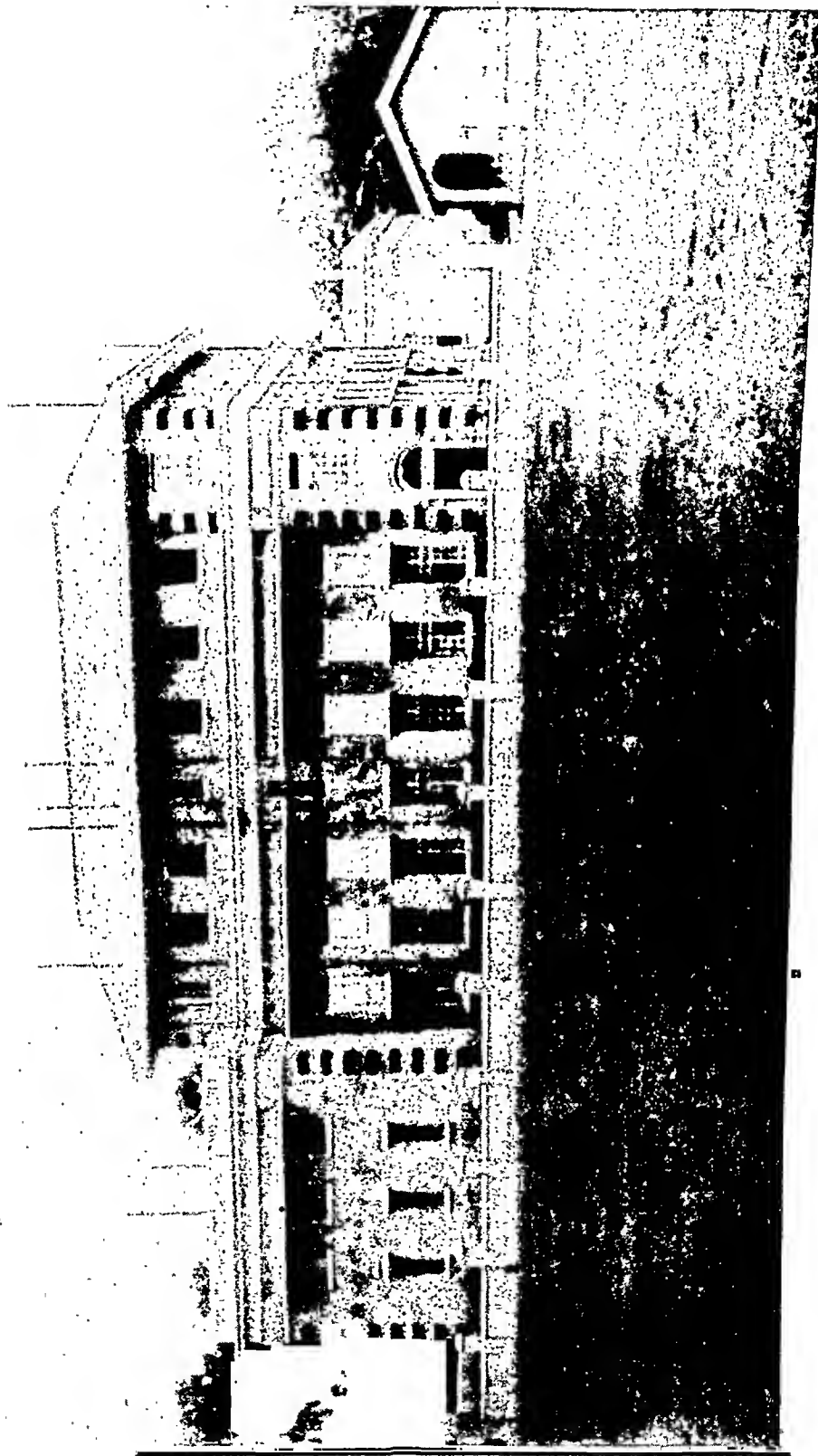
Indian Central Cotton Committee,
BOMBAY,

FOR THE

YEAR ENDING AUGUST 31st,
1927.

BOMBAY -
CLARIDGE & Co., Ltd
1927.

PRICE Rs. 2.



Technological Laboratory, Matunga.

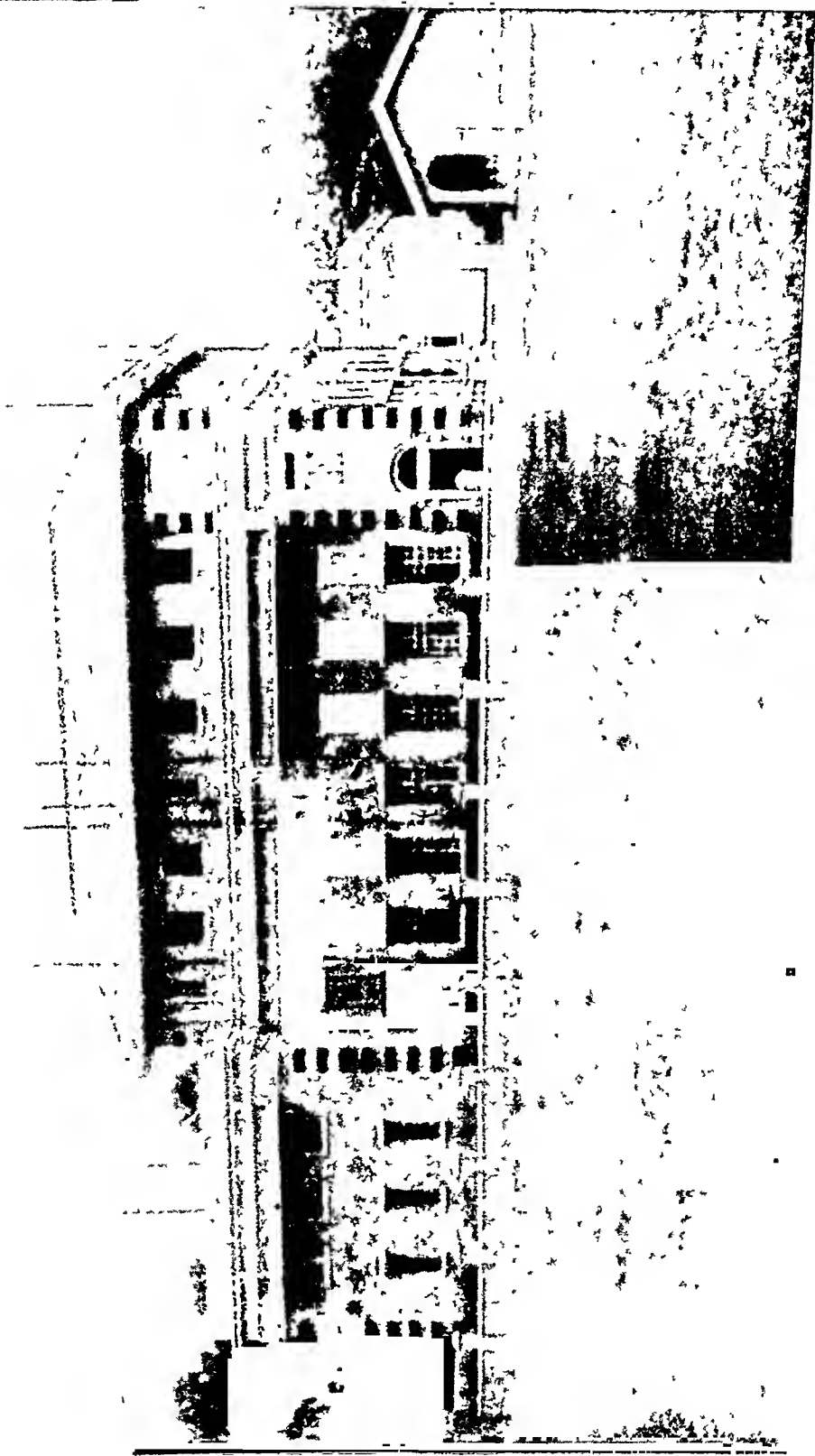
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Annual Report of the Indian Central Cotton Committee, Bombay, for the Year Ending August 31st, 1927.

THE Central Cotton Committee was constituted by Resolution No 404 22, dated the 31st of March 1921 of the Government of India in the Department of Revenue and Agriculture and was originally an Advisory Committee. With the passing of the Cotton Cess Act the Committee was permanently incorporated and provided with funds of its own for the promotion of research for the improvement of cotton growing and marketing. The Committee advises the Government of India and Local Governments on matters connected with the improvement of cotton growing and cotton marketing and not only deals with such references as are made to it, but continues to take the initiative in bringing to the notice of Government matters which require attention.

In the administration of the cotton cess funds the Committee provides for research for the benefit of cotton growing in India as a whole, and this aspect of its work is steadily becoming more important. Apart from its more formal activities the value of the Committee as a common meeting-ground for all sections of the cotton industry is annually becoming more apparent.

PERSONNEL

2 Under Rule 3 of the Indian Cotton Cess Rules, members of the Committee hold office for three years and one third of the members retire each year in rotation. The membership for 1927 was as follows —

(1) PRESIDENT—DR D Clouston, C I E, Agricultural Adviser to the Government of India *ex officio*

(2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS

<i>Madras</i>	Mr R D Anstead, C I E, Director of Agriculture
<i>Bombay</i>	Dr H H Mann, Director of Agriculture
<i>United Provinces</i>	Mr G Clarke, C I E, Director of Agriculture (Dr A E Parr, from 16th June 1926 to 4th January 1927)
<i>Punjab</i>	Mr D Milne, C I E, Director of Agriculture (Mr H R Stewart, Officiating Director of Agriculture, from May 1927.)
<i>Central Provinces</i>	Mr F J Plymen, Director of Agriculture
<i>Burma</i>	Mr H F Robertson, Deputy Director of Agriculture,

- (3) THE DIRECTOR-GENERAL OF COMMERCIAL INTELLIGENCE AND STATISTICS, *ex-officio*. Dr. D. B. Meek, O.B.E.
- (4) REPRESENTATIVES OF CHAMBERS OF COMMERCE AND ASSOCIATIONS.
- The East India Cotton Association Mr. W. Ellis Jones, M.L.C. (*Vice-President*).
 The Bombay Mill-owners' Association.. Mr. S. D. Saklatvala.
 The Bombay Chamber of Commerce .. Sir J. A. Kay, Kt., M.L.C. (Mr. C. H. Goodall from April 1927).
 The Indian Merchants' Chamber, Bombay .. Sir Purshotamdas Thakurdas, Kt., C.I.E., M.B.E., M.L.A.
 Karachi Chamber of Commerce Mr. G. C. R. Coleridge.
 Ahmedabad Mill-owners' Association.. Seth Kasturbhai Lalbhai.
 Tuticorin Chamber of Commerce Mr. G. Z. Meli.
 Upper India Chamber of Commerce .. Mr. H. A. Wilkinson.
 The Empire Cotton Growing Corporation. Mr. W. Roberts.
- (5) and (6) COMMERCIAL REPRESENTATIVES NOMINATED BY LOCAL GOVERNMENTS.
- Central Provinces* .. Sir Sorabji B. Mehta, Kt., C.I.E.
 Rai Bahadur K. J. Deshmukh, M.L.C.
Madras Mr. H. F. P. Hearson.
Punjab Rai Bahadur Seth Prabhu Dayal, M.B.E.
Bengal Mr. B. K. Lahiri.
- (7) CO-OPERATIVE REPRESENTATIVE.
 Rao Saheb V. Krishna Menon.
- (8) REPRESENTATIVES OF COTTON GROWERS.
- Madras* M.R.Ry. R. Appaswamy Naidu Garu.
 M.R.Ry. B. P. Seshia Reddi Garu.
Bombay Rao Bahadur Bhimbhai Ranchodji Naik,
 M.L.C. (Surat).
 Mr. Bakshi Darshan Singh (Sind).
United Provinces .. Kunwar Bikram Sinha of Pisawah, M.L.C.
 Rai Saheb M. Amba Prasad, M.L.C.
Punjab Capt. L. H. G. Conville.
 Sardar Ujjal Singh, M.A.
Central Provinces and Berar Rao Bahadur M. G. Deshpande.
 Mr. M. P. Kolhe, M.L.C.

(9) and (10) REPRESENTATIVES OF INDIAN STATES

<i>Hyderabad State</i>	.. Mr B A Collins, C I E, I C S, Director-General of Commerce and Industry
<i>Baroda State</i> ..	.. Mr Manulal B Nanavati, Director of Commerce and Industries
<i>Gwalior State</i> ..	.. Mr Hiralal H Pandya, Administrative Officer, Department of Agriculture
<i>Rajputana and Central India States</i> ..	Mr A Howard, C I E, Director of the Institute of Plant Industry, Indore

(11) ADDITIONAL MEMBERS NOMINATED BY THE GOVERNOR-GENERAL IN COUNCIL

- 1 Mr G H Krumbiegel, Representative of the Mysore State
 - 2 Mr C R Palaret, Member for Industries, Holkar Durbar, Representative of the Holkar State
 - 3 Mr G R Hilson, Cotton Specialist, Madras
 - 4 Dr W Youngman, Economic Botanist for Cotton, Central Provinces
 - 5 Rao Saheb Bhumbhai M Desai, Deputy Director of Agriculture, Gujarat, Surat
 - 6 Lala Niranjan Prasad, Representative of the Karachi Indian Merchants' Association, Karachi
 - 7 *Temporary Additional Member*
Mr W J Jenkins, Officiating Director, Indore Institute of Plant Industry, from July 1927
- Secretary* (appointed by the Government of India) Mr B C Burt, B Sc, M B E, I A S
- Deputy Secretary* Mr W J Jenkins, M A, B Sc, I A S
- Officiating Deputy Secretary* Mr J H Ritchie, M A, B Sc, I A S, from May 1927

3 It will be seen that several changes in membership took place during the year

Sir Joseph A Kay, Vice-President of the Committee for two years and a member of the Committee since its first meeting in 1921, retired from office in March 1927, his place as representative of the Bombay Chamber of Commerce being taken by Mr C H Goodall. At their 14th meeting the Committee placed on record their keen appreciation of Sir Joseph Kay's services to the Committee as representative of the Bombay Millowners' Association during the early stages of the Committee's work and subsequently as Vice-President during an important period of development.

Mr. W. Ellis Jones, M.L.C., who has represented the East India Cotton Association on the Committee since 1922, was elected Vice-President for the year 1927-28.

At their July meeting the Committee also recorded their appreciation of the work of the retiring Co-operative representative, Mr. B. F. Madon, who had been so intimately connected with the Committee's work on the finance of the cotton crop.

SUB-COMMITTEES.

4. The following members were appointed to form the *Standing Finance Sub-Committee* required by the Indian Cotton Cess Rules :—

Mr. W. Ellis Jones (*Vice-President*).
 Sir Joseph A. Kay, (Mr. C. H. Goodall from April 1927).
 Sir Purshotamdas Thakurdas.
 Mr. S. D. Saklatvala.
 Mr. G. C. R. Coleridge.
 Mr. G. Z. Meli.
 Dr. H. H. Mann.
 Rao Bahadur Bhimbhai Ranchodji Naik.

The Standing Finance Sub-Committee held twelve meetings during the year.

5. *The Local Sub-Committee* during the year consisted of the following members :—

Mr. W. Ellis Jones, (*Vice-President*), Sir Joseph A. Kay, (Mr. C. H. Goodall from April 1927), Sir Purshotamdas Thakurdas, Mr. S. D. Saklatvala, Mr. G. C. R. Coleridge, Mr. G. Z. Meli, Dr. H. H. Mann, Rao Bahadur Bhimbhai Ranchodji Naik, Mr. Manilal B. Nanavati, and Seth Kasturbhai Lalbhai.

The object of this Sub-Committee, which includes all members of the Central Cotton Committee living in or near Bombay, is to deal with matters of general importance in the interim between meetings of the full Committee ; to the meetings all members of the Central Committee who may be visiting Bombay are invited. This Sub-Committee has again performed most valuable work not only in dealing with various references from Government which required prompt attention but in the detailed examination of many matters dealt with by the Central Committee to which the Local Sub-Committee reports. The appointment of a Special Sub-Committee to deal with matters arising out of the Cotton Ginning and Pressing Factories Act has relieved the Local Sub-Committee of a certain amount of work ; nevertheless, it has been fully occupied with the details of the various matters of importance which have come before the Committee. This Sub-Committee held eleven meetings during the year.

6 *Cotton Ginning and Pressing Factories Sub Committee*—The Sub-Committee was first appointed on July 6th 1925 for the purposes of Section 2 (f) of the Cotton Ginning and Pressing Factories Act. The membership for 1927 is as follows —

- (1) The Vice President, Chairman (*ex officio*), Mr W Ellis Jones
- (2) Five members representing the cotton trade who are residents of the Bombay Presidency —

Sir Joseph A Kay (Mr C H Goodall from April 1927),
Mr S D Saklatvala, Sir Purshotamdas Thakurdas,
Mr G Z Meh and Mr G C R Coleridge

- (3) Four up country members —

<i>Madras</i>	Mr H I P Hearson
<i>United Provinces</i>	Mr H A Wilkinson
<i>Punjab</i>	Rai Bahadur Seth Prabhu Dayal
<i>Central Provinces and Berar</i>	Sir Sorabji B Mehta

- (4) The Co operative Representative—Rao Sahib V Krishna Menon

The Sub Committee dealt with a number of questions in regard to the working of the Act to which reference is made in a later section of the report, seven meetings of the Sub Committee were held during the year

7 *Special Standing Sub Committee on the Finance of the Cotton Crop Up country*—The members of this Sub Committee during the year were —

Sir Joseph A Kay (*Vice President* and *Chairman* until March 31st),
Mr W Ellis Jones (*Vice President* and *Chairman* from April 1st),
Dr H H Mann and Mr B F Madon

This Sub Committee held three meetings during the 12 months ending August 31st, 1927, examined the reports on the Khandesh, Berar and Upper Gujerat investigations and reported on these to the Central Committee. They also prepared the detailed schemes and revised questionnaires for the Punjab, Madras Middle Gujerat Sind and (second) Khandesh investigations which are being carried out during the cotton season 1927-28

8 *Agricultural Research Sub Committee*—This Sub Committee meets in conjunction with meetings of the full Committee and examines research proposals, the progress reports on research schemes and the reports of research students. The Sub Committee appointed in January 1927 consisted of the following members —

Dr D Clouston, (*President*), Mr W Ellis Jones (*Vice President*),
Sir Joseph A Kay, Mr A Howard (Director of the Institute of Plant Industry, Indore), Rao Sahib V Krishna Menon (Co operative Representative), Mr S D Saklatvala (Cotton Trade Representative), Mr W Roberts (Cotton Growers' Representative), Dr H H Mann, Mr D Milne, Dr W Youngman and Mr R D Anstead (Representatives of Agricultural Departments), Mr G R Hilson and Mr Trevor Trought (Co opted members), and the Secretary

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Several members being absent from India on leave, the following members were appointed at the July meeting :—

Mr. W. J. Jenkins (during Mr. Howard's absence).

Mr. H. R. Stewart (during Mr. Milne's absence).

9. *Technological Research Sub-Committee*.—This Sub-Committee meets in connection with meetings of the Central Committee, and also at other times when necessary, to discuss matters arising out of the Committee's arrangements for technological research and to advise the Central Cotton Committee and the Director of the Laboratory on the management and development of the Committee's Technological Research Laboratory. The Sub-Committee appointed in January 1927, consisted of :—

The Vice-President, Mr. W. Ellis Jones; Chairman (*ex-officio*); Sir Joseph A. Kay, Mr. S. D. Saklatvala, Sir Sorabji B. Mehta, Seth Kasturbhai Lalbhai, Sir Purshotamdas Thakurdas, Dr. H. H. Mann, Mr. A. Howard, Mr. D. Milne, the Secretary and the Director, Technological Research Laboratory.

To fill leave vacancies the following members were appointed in July 1927:—

Mr. G. R. Hilson, Mr. W. J. Jenkins (during Mr. A. Howard's absence).

10. *Selection Sub-Committees*, as required by the Indian Cotton Cess Rules, were appointed from time to time to deal with appointments on the staff of the Committee.

The *Research Students' Selection Sub-Committee* met as usual in January 1927.

11. As is only natural for a body of 43 members, much of the detailed work of the Committee was carried out through the medium of the Sub-Committees referred to above. To the gentlemen who served on these Sub-Committees and, in particular, to those members of the commercial community in Bombay, who again have given so freely of their time to the furtherance of the Committee's work, much of the success which has attended the Committee's labours is due.

MEETINGS.

12. As usual the Central Cotton Committee met twice during the year, viz., on January 24th to 26th and July 16th to 19th; the summary of the proceedings which follows will indicate the steadily growing mass of important work with which the Committee deals. At the January meeting Messrs. F. W. Hodgkinson of the British Cotton Growing Association and F. Noyce, C.S.I., C.B.E., I.C.S., President of the Cotton Tariff Board (Cotton Textile Industry Inquiry), both members of the touring Indian Cotton Committee of 1917-18, were present as visitors, and representatives of five maritime Kathiawar States, viz., Cutch, Bhavnagar, Junagadh, Navanagar, and Porbandar, attended by special invitation of the Government of India to discuss with the Committee various matters connected with the importation of cotton-seed at Kathiawar ports.

Mr T B Fletcher, Imperial Entomologist, kindly attended both meetings to assist the Committee in the discussion of matters connected with the restrictions placed on the importation of American cotton to prevent the introduction of the Mexican boll weevil

The Karachi Indian Merchants' Association were granted representation on the Committee from July 1927, their representative, Lala Niranjan Prasad, attended in January as a visitor by special invitation

STAFF

13 Mr Burt returned from leave on November 15th, 1926, and resumed charge of the office of Secretary

Mr Turner resumed charge of his duties as Director, Technological Research Laboratory, on return from leave on October 26th, 1926, relieving Mr W G P Wall whose services were kindly lent to the Committee by the Government of the United Provinces

Mr Trevor Trought Cotton Research Botanist, Punjab, held charge of his post throughout the year

Mr W J Jenkins was appointed to officiate as Director of the Indore Institute of Plant Industry from May 5th to November 19th, 1927, during Mr Howard's absence on leave

Mr J H Ritchie, I A S (Deputy Director of Agriculture, Central Provinces), was appointed to officiate as Deputy Secretary from the 9th of June 1927

Mr Richardson, Spinning Master, Technological Laboratory, held charge of his post until June 6th when he proceeded on 3 months' leave, Mr A D Walwyn (whose services were kindly lent by Messrs Brady & Co) acting as Spinning Master during his absence

Messrs Sen, Dutt and Hari Rao, Research Assistants, Technological Laboratory, held charge of their respective offices throughout the year save for short periods of leave

Mr Ram Saran Koshai, M Sc, previously one of the Committee's Research Students, was appointed to the post of Research Assistant (Junior Physicist) from July 1st, 1927, *vice* Mr Bathija resigned

Mr Amar Nath Gulati was appointed to a new post of Research Assistant at the Technological Laboratory (Junior Microscopist) from July 14th, 1927

Mr H D Nangpal previously a Research Student in Entomology, was appointed to the post of Assistant Entomologist and his services placed at the disposal of the United Provinces Government for employment in connection with the Pink Bollworm Research Scheme at Cannanore.

Mr. D. F. Kapadia, B.Sc. (Tech.), Manchester, previously a Research Student under the Committee, was selected for the post of Assistant Technologist at the Technological Laboratory.

Further details of the staff of the Technological Laboratory will be found in the Director's report, (page 48).

PROVINCIAL AND LOCAL COTTON COMMITTEES.

14. Provincial Cotton Committees met as follows during the 12 months ending August 31st, 1927 :—

Madras	..	..	..	Twice (one being a general conference).
Punjab	..	..	..	Once.
Central Provinces and Berar.				Once.

A Gwalior State Cotton Committee was constituted in March 1926 and has held three meetings since its inception. This Committee has undertaken the examination of several questions connected with cotton development in the Gwalior State and has a most useful field of work open to it.

15. In Bengal a Sub-Committee of the Provincial Board of Agriculture deals with cotton matters. In Bombay no Provincial Cotton Committee has yet been appointed and several matters which normally would be dealt with by such a Committee were referred by the Government of Bombay to the Central Cotton Committee and dealt with mainly by the Local Sub-Committee. Other local cotton matters are dealt with by the Divisional Cotton Committees appointed by the Government of Bombay.

16. In Madras, Local Cotton Committees exist for the following areas :—Nandyal, Bellary, Guntur, Tuticorin and Tiruppur.

17. Meetings of Provincial and Local Cotton Committees are held at irregular intervals according to the number of references before them for consideration. In several provinces Provincial Boards of Agriculture are in existence which deal with certain questions which would otherwise fall within the purview of Provincial Cotton Committees. Except in Madras insufficient advantage would seem to have been taken of the opportunities which Provincial Cotton Committees offer for joint discussion between commercial and agricultural representatives of the many questions of common interest. A further common fault in the organization of Provincial Committees is that it still frequently happens that provincial representatives on the Indian Central Cotton Committee are not always members of the Provincial Cotton Committee and hence the members of the latter are far too dependent on the Central Cotton Committee's publications for their knowledge of the work which is being done for cotton improvement even in their own Province.

CHAPTER II

THE WORK OF THE YEAR

18 One of the most striking features of the year's work is the development of research work financed by the Committee, this is referred to in more detail in the two succeeding chapters. Other features have been increased attention to the improvement of cotton marketing and to the discouraging of abuses. The Committee has also given considerable attention to the prevention of the introduction of foreign insect pests and diseases of cotton, and details connected with the enforcement of the restrictions on the importation of American cotton have occupied a considerable portion of the time of the Committee and of its staff. Work in connection with the Cotton Transport Act, the Cotton Ginning and Pressing Factories Act and the improvement of cotton statistics is referred to below, as also the steps which the Committee has taken to promote the improvement of cotton marketing.

19 The year under report has been abnormal in many respects. The record American cotton crop of 1926, which amounted to 17,977,374 bales of 500 lbs each excluding linters, caused a rapid fall in prices which was the more marked in that estimates of the crop rose rapidly as the season progressed. The area of cotton sown in India in the season 1926-27 was 24,976,000 acres as compared to 28,491,000 acres in the previous year and the estimated outturn at the time of the supplementary (April) cotton forecast was 4,973,000 bales as compared to 6,250,000 bales, the revised figure for the preceding year, but the returns of cotton pressed up to the end of August 1927 indicate that the crop was under estimated. Nevertheless, the yield was definitely unsatisfactory in certain important areas, particularly in the Punjab where the production of Punjab-American was estimated to be only 221,000 bales as compared to 359,000 bales in the previous year, in addition to the diminished yield the quality was unsatisfactory. Exports for the 12 months ending August 31st, 1927, amounted to 2,830,000 bales only as compared to 3,775,000 bales in the previous year and, as might be expected in view of the large American crop, exports were mainly confined to short-staple cotton. Until very recently Indian prices were well above American parity so that in consequence there was a tendency for the margin between the prices of Indian short staple cotton and Indian long staple cotton in Bombay to narrow. Another feature of the situation was the importation of large quantities of low grade American cotton for use in Indian mills; such cotton was relatively cheap and the total imports for the season amounted to 324,585 bales. In December and January it was feared by some that these imports of American cotton would depress the prices of Indian staple cotton unduly and thus tend to discourage the growing of superior cottons and the Committee was asked to consider whether steps should be taken to assist growers of Indian staple cottons to hold up their produce for more favourable prices. Against any such action it was urged that the prices of all Indian cottons were still above Liverpool and New York parity. Such

parity is usually expressed with reference to the prices at which Indian cottons can profitably be exported but when the competition of imported cotton with Indian cotton is considered, it has to be borne in mind that, as the cost of export and import represents about $\frac{1}{2}d.$ per pound in each direction, the Indian mill demand for staple cottons (which exceeds one million bales annually) is a most important protection to the Indian grower of such cottons. The Committee's conclusion was that so long as Indian cotton remained above American parity any attempt to interfere with the ordinary laws of supply and demand would be of a highly speculative nature and likely to do more harm than good. In coming to this conclusion the Committee were guided by the fact that the stocks of Indian staple cottons in Bombay were small and that such forward sales of Indian staple cottons, e.g., Surats, as had been made up to that time had been effected at satisfactory premiums: hence it was felt that too much stress should not be laid on the narrowing of the margins between the Broach and Oomras Hedge Contract prices. That this conclusion was a correct one is indicated by the fact that the premium for the best Surat cotton in March and April was some Rs. 70 per candy over Broach which was the same premium as in the previous year despite the general fall in prices. The situation was further eased by a steady recovery of American prices. Finally it is of interest to note the comparative figures for the ascertained stocks in Bombay on August 31st of unsold cotton of various growths shown in the following table which has been compiled from the East India Cotton Association's returns:—

Descriptions.	31st August, 1927.	31st August, 1926.	31st August, 1925.	31st August, 1924.	31st August, 1923.
Broach	15,463	11,493	16,852	17,463	41,158
Dholleras	33,698	30,704	20,097	22,298	106,640
Oomra	41,905	62,378	54,055	73,049	72,995
Khandesh	4,795	15,292	12,464	16,846	15,338
Bengals	12,720	24,193	14,397	19,069	16,952
Punjab/American	3,762	11,188	14,542	17,311	19,652
Dharwar	4,085	4,883	6,850	2,795	16,686
Comptas, Tinnevellys and Cambodia	27,218	20,486	29,176	19,405	36,765
Westerns and Northerns	22,628	18,158	26,007	12,319	28,883
Persian	200	563	1,476	49	390
Americans	1,920	460	..	575	140
Egyptians	5	7	..	..	..
East Africans	6,659	10,549	4,787	7,434	} 21,817
Other sorts	6,520	13,326	11,134	24,954	
Total	181,578	223,680	201,837	233,567	367,416

It will be seen that there has been little if any accumulation of stocks of Indian staple cotton and that the imports of American cotton have done little or nothing more than replace the actual shortage of certain types of Indian cotton. That India should be considerably affected by the fall in price of American cotton was inevitable; this has doubtless had its effect on the area sown in the season 1927-28.

THE COTTON TRANSPORT ACT

20 BOMBAY—This Act was in force in the Bombay Presidency throughout the year

In Gujerat three protected areas were maintained, viz —

The South Surat zone, the Surat zone and the Olpad-Ankleshwar zone

In the Southern Division also three protected areas were maintained, viz —

The Kumpta-Dharwar zone, the Bijapur zone, and the Bagalkot zone

In this Presidency the restrictions apply to the transport of cotton (kapas and seed) by road as well as by rail. The enforcement of the restrictions on transport by road between the three comparatively small Surat zones has always presented some difficulty but these restrictions were necessary so long as a definite area of inferior cotton existed in the Olpad taluka. The replacement of short stapled varieties by the improved variety 1027 A L F having made considerable progress—and the active co operation of the Co operative Societies in the tract between the Tapti and Nerbada in this policy having been promised—the Government of Bombay withdrew the restrictions on the transport of cotton by road between the South Surat, Surat and Olpad Ankleshwar zones on *August 10th 1926 the first crop to be affected by the changed condition being that to be harvested in March-April 1927. It has been made a condition of the concession that the amending notification will be cancelled if inferior cotton is found to be grown in any of the protected areas. The restrictions on the transport of cotton by rail between the three zones have been maintained.

Unfortunately it appears that the organised distribution by Co operative Societies of impure seed of the inferior Surat I A variety continued during the sowing season 1926 and that as there still remains a considerable area of inferior cotton in the neighbourhood of Sonsek the expected progress in establishing a single improved variety up to the Nerbudda has not been realised and the question of re imposing the original restrictions will have to be considered. The Central Cotton Committee has advised on a proposal to apply the Cotton Transport Act to the protection of the Broach cotton area and has recommended a single large protected area from the River Nerbudda to the River Mahi and that restrictions be placed on the transport of cotton, kapas and seed by rail only.

21 In the Southern Division of the Presidency three protected areas are maintained viz, Bagalkot area, the Bijapur area and the Kumpta Dharwar area. The following stations were added to those scheduled in the last named area by notification No 535-A (Revenue Department), dated the 8th of August, 1927 —

All stations on the Alnavar Dandeli Branch *

* For amending notification see Appendix I

It will be remembered that prior to the introduction of the Act short staple Khandesh cotton, cotton fly from Bombay and Persian cotton *via*. Goa were freely imported into this area for purposes of mixing, Hubli in particular having acquired a most undesirable reputation as a mixing centre. These gross forms of adulteration have undoubtedly been stopped and the price and reputation of Kumpta and Dharwar Upland cottons have been enhanced accordingly. Complaints of mixing continue to be received and as they have been enquired into in some detail may be referred to briefly. It was stated that mill fly was again being mixed with Dharwar-American cotton in this area, but no evidence that any fly had been imported was forthcoming and it appeared probable that the complaint had been exaggerated. Relatively small quantities of fly had been sold locally by mills situated within the area which may have been used for mixing. Assurances have now been received that all the fly produced in these mills will be used for waste spinning and not sold locally. Complaints have also been received of the mixing of superior and inferior qualities of Kumpta cotton and of Dharwar-American (Upland) with Kumpta and it should be said at once that the Cotton Transport Act cannot be used to prevent the mixing of two varieties of cotton grown in the same area. The mixing of Dharwar Upland with Kumpta is an exceedingly short-sighted policy; both are staple cottons which if marketed unmixed command good prices, the actual prices depending on the seasonal demand. In all qualities except length of staple the two cottons are markedly different. The areas in which the two cottons are grown are fairly definite and the existence of the two types is due to climatic reasons but unfortunately it does not seem practicable to define separate Upland and Kumpta areas for notification under the Act. The question of the prevention by other methods of the type of mixing is at present under the consideration of the Committee.

The general administration of the Act in this area has received the very careful attention of the Committee and of the Bombay Agricultural Department during the year under report. Check stations have been established at several points to stop the introduction of kapas and cotton from outside the protected area where experience has shown them to be necessary. As in previous years licenses have been granted for the admission of large quantities of kapas from the adjoining portions of the Nizam's Dominions as the area served by the Gadag market (and which grows Dharwar-American cotton) extends considerably beyond the provincial boundary. The arrivals have been carefully examined at the market to ensure that the licenses are not abused.

The Agricultural Department has also developed and extended its organisation for the supply of pure seed of the two improved strains Gadag No. 1 (Upland) and Dharwar No. 1 (Kumpta) which are now well established in this tract.

22. **BARODA.**—The Gaekwar's Government have continued to enforce a Cotton Transport Law similar to the Cotton Transport Act and to maintain three protected areas corresponding with the Bombay zones with

which they are interlaced. Their co operation in this respect and in the establishment of the same improved variety of cotton, viz, Surat 1027 has done much to make the working of the Act in Gujerat successful and to protect their own Navsari cotton which is the best type of Surat.

23 **RAJPIPLA**—The Rajpipla State also maintained in force a State law on the same lines as the India Act, the whole State being constituted as one area since it now grows one improved variety of cotton. The history of Rajpipla cotton provides an excellent example of what can be done by the exclusion of inferior cotton coupled with the systematic introduction of superior seed. Some years ago the cotton of this State was almost a drug on the market. Since then the Surat 1027 variety has been steadily introduced and in this way, with the assistance of the Cotton Transport Act and of State control of the ginning factories the standard of Rajpipla cotton has been raised to equal that of the best Surat. On the recommendation of the Indian Central Cotton Committee the East India Cotton Association introduced special standards for Rajpipla cotton in Bombay from June 1st, 1925.

24 **CHHOTA UDEPUR STATE**—Similar action has been taken by the Darbar of the Chhota Udepur State which is situated on the North east of the Rajpipla Baroda and Bombay protected areas. By a Cotton Improvement Act* which came into force on August 15th, 1927 the importation of cotton from outside (save under license) has been prohibited and the variety Surat 1027 has been adopted for cultivation throughout the State. State control of cotton ginning and pressing factories has also been introduced. There is every reason to believe that similar success to that obtained by the Rajpipla State will be achieved.

25 **MADRAS**—The Cotton Transport Act was put into force in the Madras Presidency by notification No. 344 of the 18th of November 1925, approved by resolution of the Madras Legislative Council on August 26th, 1925, a copy of the notification will be found in Appendix III.

In the Northern and Western area the notification appears to have worked smoothly and to have achieved the desired object. Certain difficulties, however, have arisen over the administration of the Act in the South. The inclusion of the Dindigul area in the Coimbatore protected area under the original notification and its separation from Virudupatti in the Tinnevely area was the subject of much criticism by the local cotton trade. On the other hand the need of protecting the Salem area which grows mainly Cambodia cotton, much of which, however, is dry Cambodia as distinct from the irrigated Cambodia of the Coimbatore District, from the introduction of inferior cottons from outside the province had become increasingly obvious. Having due regard to the existence of natural boundaries, the varieties of cotton grown (see Appendix IV) and market and ginning

and pressing facilities the Agricultural Department finally proposed the formation of three distinct protected areas, viz. :—

- (1) The Coimbatore area consisting of the Coimbatore District plus the taluqs of Karur (Trichinopoly District) and Palni (Madura District). This would be essentially an irrigated Cambodia area with Karunganni as an unirrigated cotton.
- (2) A Salem-Dindigul area which would include the Salem District, that portion of the Madura District north of the river Vaigai, the Trichinopoly District, the North Arcot District and also the districts of Chittoor, Chingleput, South Arcot, Ramnad and Tanjore. This again would be mainly a Cambodia area as, of the total cotton cultivation of some 220,000 acres, 180,000 acres is Cambodia but mainly unirrigated.
- (3) The Tinnevely area as at present growing 740,000 acres of cotton of which 680,000 is Tinnevely (some 300,000 being Karunganni) and 60,000 acres is Cambodia.

The Provincial Cotton Committee recommended that these three zones should be combined and that one protected area only should be constituted for the Tamil Districts. These proposals are at present under the consideration of the Madras Government.

Without entering into a discussion of a somewhat controversial matter it may be observed that there is general agreement that the Cotton Transport Act should be kept in force. Whilst the Agricultural Department consider that, without being unworkably small, the protected areas should be such as would be of definite assistance to the Agricultural Department in their effort to build up compact areas each growing a single type of improved cotton, the local cotton trade appear to consider it sufficient to keep out the worst rubbish which previously came from outside the Province. The Provincial Cotton Committee's proposals would at least enable inferior cottons from the Mysore and Hyderabad States, from the Central Provinces and from the Cocanadas tract to be kept out of both protected areas.

26. *CENTRAL PROVINCES.*—The Indian Central Cotton Committee has recently advised the constitution of a single protected area consisting of the civil districts of Buldana, Akola, Amraoti, Yeotmal, Chanda, Wardha, Nagpur, Chhindwara, Seoni and Bhandara, instead of two distinct Central Provinces and Berar areas as recommended in 1923. Though the Wardha river forms a natural boundary between Berar and the adjoining Central Provinces districts, it does not form a satisfactory division so far as the present trade classification into Oomras, C.P. 1 and C.P. 2 is concerned, or from the point of view of the quality of the cotton grown at present. It therefore appears wiser to limit the application of the Act to the exclusion of inferior Khandesh and Central India cottons from the combined area now proposed.

27 **INDORE**—The attention of the Central Cotton Committee having been drawn to the considerable importation of inferior Rajputana Bengals cottons into Central India stations which at present have a reputation for better cotton in Bombay, the Holkar and Gwalior Durbars were requested to examine the possibility of passing legislation on the lines of the Cotton Transport Act to prevent this form of mixing and to protect the reputation and purity of their superior cottons. The Holkar State promptly introduced a Cotton Transport Bill which will come before the next session of their Legislative Committee. Their prompt action in this matter should do much to maintain the reputation of their Malwa cotton and to aid materially in the establishment of a purer type of this cotton which the supply of seed from the Indore Institute of Plant Industry shortly should render possible.

The Gwalior Durbar and the Gwalior Cotton Committee are examining the best means of maintaining the quality of their cottons and preventing the introduction of inferior cottons for mixing.

28 **HYDERABAD**—The Nizam's Government have recently passed a Cotton Transport Ordinance to protect from degeneration the large areas of long staple *Bani* cotton (Hyderabad *Gaurani* cotton—*G. indicum*) which still exist in that State. The best cotton of this type is in good demand by Indian mills, and being capable of spinning 30s counts fetches good prices. Much of the cotton is distinctly mixed and unless steps are taken to protect those areas where the cotton exists in a state of comparative purity rapid degeneration seems inevitable. For some years past large quantities of good seed have been regularly distributed but this measure alone has not had the desired effect.

By notification under the Ordinance a protected area has been declared which consists of the *Bani* cotton growing area serving the well known Nander and Latur markets including most of the Nander civil district and portions of the Bidar and Adilabad districts. The area has been fixed with due reference to the existence of suitable natural boundaries and to the position of markets and the nature of the communications.

In the adjoining district of Parbhani there is still a considerable amount of long-staple cotton produced but a considerable portion of the arrivals in the Parbhani market in recent years have been short staple or mixed cotton. Hence this district has not been included in the protected area but special auction sales of long-staple cotton at Parbhani have been organised for the coming season in order to re-establish the premium for long staple *kapas* which growers in this area used to obtain but which has recently disappeared with the loss of the reputation of the market.

THE COTTON GINNING AND PRESSING FACTORIES ACT, XII OF 1925

29 This Act came into force in August 1925 and has now been in force for two years. Section 14 of the Act became effective for the cotton season commencing September 1926 and from that date any purchaser is

entitled to require that no bales other than those marked in accordance with the provisions of the Act, shall be supplied in fulfilment of a contract. From the same date amendments to By-laws* 53 and 66 of the East India Cotton Association have been in force which declare cotton not marked in accordance with the Act (or with the law in force for the marking of bales in any Indian State) to be 'not a fair tender' and hence to be liable to both rejection and a penalty. This by-law was enforced at a recent arbitration in Bombay where the bales though they bore the mark of the press were not marked in accordance with the Act and indeed had been marked in such a way that the marks could easily be removed. The arbitration award was upheld by the Appeal Committee and by the Board of the Association.

30. The marking of bales is now in force in the following Indian States:—

Hyderabad (the Nizam's Dominions), the Baroda State, the Holkar State (Indore), the Alwar State, Nabha, Jodhpur, Jaipur, Rajpipla, Navanagar, Cambay, Katosan, Jhalawar, Limbdi, Wankaner, Chhota Udepur, Barwani and Alipura.

Weekly cotton press returns have been established by the following States:—

Nabha, Jodhpur, Jaipur, Alipura, Rajpipla, Baroda, Hyderabad and Alwar.

It is understood that the other provisions of the Act will be put in force in Hyderabad State at an early date and the Gwalior State have a law under preparation. The co-operation of practically all other Indian States possessing cotton pressing factories has been promised, the only important exception being Mysore. It is hoped that before the end of the present cotton year the measures proposed by the various States will have come into force, that the marking of bales will be universal and the weekly press returns complete for the whole of India.

31. The rules for the marking of bales have worked smoothly and the method of marking adopted has proved practicable and generally suitable. Many pressing factories are now equipped with simple punching machines for applying the press mark to the hoops, some are still using hand punches. The East India Cotton Association, members of the Committee and a number of millowners from time to time have reported to the Committee cases of unmarked bales and incorrect marking. These have been brought to the notice of the provincial authorities concerned and warnings issued. In a few cases of repeated neglect to mark bales, prosecutions have been instituted.

One prosecution has been instituted for neglecting to comply with a requisition (under Section 3(iii) of the Act) for a certified copy of the entries in the press-register relating to certain bales.

32 A common mistake which was brought to light was the use of numerals denoting the calendar year as distinct from the cotton year as required by Rule 7 of the Indian Cotton Ginning and Pressing Factories Rules. In all provinces except Madras the cotton year runs from September 1st to August 31st and in Madras from February 1st to January 31st. Hence for example a bale pressed in press 501 Bombay Presidency in January 1927 should be marked 501 B 26 and not 501 B 27. The Committee issued a press communique and a circular to all press owners drawing attention to this rule. Some instances were brought to notice of bales bearing on the central hoop a double press mark, owing to second hand hoops having been used, and in one instance the two marks referred to bales pressed in the same season. In most cases it is impossible for hoops to get back into use before the end of a season but it is possible for hoops sold by a mill situated in a cotton growing tract to be used twice in a season. As the cotton pressing season rarely exceeds six months and is frequently considerably shorter this difficulty could be got over by mills arranging not to sell second hand hoops during the pressing season. It seems probable however that an amendment of Rule 7 of the Indian Cotton Ginning and Pressing Factories Rules prohibiting the presence of more than one mark on the hoop will be required.

33 *Paving of press houses* (Section 9 of the Act) —At the request of the Collector of Bombay [who is the authority for the purpose of Sections 9(2) and 9(4) of the Cotton Ginning and Pressing Factories Act in the Bombay Presidency] the Committee made recommendations as to the forms of flooring that should be recognized in pressing factories, which were as follows —(1) Dressed stone paving, (2) brick set in lime or cement, (3) a properly laid wooden floor of planks or blocks, (4) cement concrete, (5) lime concrete with cement finish. Press owners were notified that one or other of the above approved forms should be provided within a year.

The Collector of Bombay made a further reference on the subject pointing out that many protests, particularly from Khandesh, had come in, objecting to the exclusion of *tatties* or lattice flooring which was said to be used with the object of cleaning the cotton. It was represented that it would be an unnecessary expense to require press-houses to be paved under the lattices. It was decided, after a personal discussion with the Collector, that lattice flooring should be added to the list of permitted floorings on that it must be clearly understood that the whole of the floor of the press house must be covered with one or other of the approved forms and not a lattice extending over part only of a room or each floor will not be permitted.

34 *Weights and scales* in cotton ginning and pressing factories. Rules made by the various Local Governments under Section 10 of the Act vary considerably in detail but all are in substance to the effect that scales and weights and that of approved weights and measures shall be used in the fact that, whatever the local system of measurement the measurement of *kapas* takes place in the same unit.

The Bombay rules are now under revision and the Committee has advised on new rules which provide for the certification and testing of weights, scales and weighing apparatus and lay down standards of permissible deviation. The draft rules as recommended by the Committee will be found in Appendix VI.

35. *Effect of the Act.*—As stated in last year's report, ample evidence has been received of the need for measures to discourage malpractices in cotton ginning and pressing factories. The Act places the buyer in a better position to protect himself against unsatisfactory cotton as he has now the means of tracing such cotton to its source. But it appears probable that to deal with certain major abuses the Act will have to be supplemented by other measures. The Committee is at present examining the question with special reference to the extent to which these abuses can be checked with the help of organised cotton trade associations and also whether further legislation is necessary and if so, what form it should take.

36. *Watering of cotton during pressing.*—There is probably no malpractice which has done more to destroy the reputation of certain growths of Indian cotton than watering and this was very emphatically stated in the report of the Indian Cotton Committee of 1917-18; there is probably no practice against which Indian millowners have more frequently and more strenuously protested. For the past ten years or so complaints on this score have been less common and, though a certain amount of damping has been customary in certain districts, deliberate and fraudulent watering has been comparatively rare of late years. Unfortunately there has been a marked recrudescence of the practice during the present year. The principal complaints arose, as in previous years, from Berar and the Central Provinces though there were also complaints about cotton from other areas. The sequel was very much what would be expected. To begin with certain stations, notably Shegaon, acquired a bad reputation and buyers fought shy of such cotton, later the prejudice extended to Berar cotton generally until it was estimated that the general price of Berar cotton was reduced by some Rs. 20 to Rs. 25 per candy. The Berar crop of 1926-27 was of unusually high grade due to the absence of rain damage and black-leaf. The export demand was fairly steady but up-country prices were distinctly above Bombay parity and up-country buyers resorted to watering to cover the difference. A more short-sighted step can hardly be imagined. Up-country dealers who parted with their watered cotton early in the season doubtless made a profit of some Rs. 6 per candy by watering. Bombay holders of such cotton found it deteriorating rapidly in stock and at the end of the season cotton of this description was unsaleable in Bombay except at Rs. 5 or more per candy off the market quotation for Oomras whilst at the same time unwatered cotton was fetching Rs. 11 over the hedge contract price. The inevitable result was lower prices to the grower and a bad reputation in the market which will probably last beyond this year.

The Committee has published a technical bulletin describing the results of comparative spinning trials and laboratory investigations on the result

of watering on cotton and also a popular pamphlet, in English, Hindi, Marathi and Gujarati, to give prominence to the economic loss caused by this practice, the latter publication is reproduced in Appendix VII

37 *Mixing*—Numerous complaints were received of the mixing of inferior with superior Kumpta cotton and of the mixing of saw-ginned Dharwar cotton with Kumpta. These have already been referred to in connection with the working of the Cotton Transport Act. Kumpta cotton is a staple cotton used almost entirely by Indian mills and but rarely exported. In normal years Dharwar American Upland is partly exported and partly consumed locally but exports in 1927 were impossible as Bombay prices were above Liverpool and American parity. At the commencement of the season Kumpta cotton was quoted at Rs. 26 per candy above Broach but lack of confidence in its quality caused a considerable fall. On account of the general shortage of staple cotton and the fact that the price of Dharwar American was largely governed by the price at which low grade American could be imported, un-mixed Dharwar Upland of good quality fetched very fair prices as was evidenced by the prices paid at the Gadag Co-operative Sale Societies' auctions for the Gadag No. 1 selection. The folly of mixing these two dissimilar cottons can hardly be over emphasised.

FINANCE OF THE COTTON CROP AND PRIMARY COTTON MARKETING

38 The results obtained from the Khandesh, Berar and North Gujar investigations were summarised in the report for 1926 and as that report included the final results and conclusions up to March 1927 there is at present little to add. It was decided after the examination of the above mentioned results, to undertake investigations in Sind the Punjab and in Middle Gujarat and to repeat and complete the Madras investigation in the Northern and Western tracts. In Sind and Middle Gujarat the enquiries are being conducted by a whole time staff on the same lines as adopted for Khandesh and Berar. In Madras, last year's attempt to obtain the necessary information through the ordinary staff of the Agricultural Department was only partly successful for although useful information concerning cultivators' borrowings was obtained, pressure of other work prevented the staff from completing the records of the sales, hence arrangements have been made for a full-time staff in 1927. The Punjab investigation is being conducted in co-operation with the Punjab Board of Economic Enquiry, the Central Cotton Committee's grant provides for the investigation in the Canal Colonies whilst the Board is financing a similar enquiry in the South-East Punjab.

It was decided in July that the original Khandesh enquiry should be repeated not that it was incomplete but because it was felt that, while certain main facts and conclusions have been arrived at, the actual details

of 1927-28 may differ considerably from those of 1925-26. The intervening period has seen a slump in cotton prices followed by a recovery whilst the original investigation was carried out after a period of distinct prosperity. Both to confirm previous conclusions as well as to ascertain the effect of such seasonal factors, and also to afford a more definite basis of comparison for the results from new areas, the repetition of either the Khandesh or Berar enquiries seemed called for; the former was selected on grounds of convenience. There are now five investigations in progress and when the results of these have been analysed it should be possible to form some conception of the problem of primary cotton marketing for India as a whole.

OPEN COTTON MARKETS.

39. As stated in last year's report, the local investigations referred to in the preceding section definitely showed that, in some areas at any rate, the great need of the cotton-grower is better market facilities. The principal results were summarised in a pamphlet on primary cotton marketing which for convenience is reproduced in Appendix VIII. Meantime distinct progress has been made in this direction.

INDORE.

40. The Holkar State established an experimental cotton market at Sanawad in the year 1925, which was controlled by a Market Committee on which growers were represented, this being the first instance of the Central Cotton Committee's recommendations on this point being given practical shape. The market has proved a distinct success and has been of value both to growers and traders. Despite the fact that on the whole indebtedness appears to be considerably heavier amongst the growers of this tract than in Khandesh and Berar, the proportion of *kapas* brought to market by growers, viz., 75 per cent., was eminently satisfactory. The Holkar Durbar have now authorised the opening of at least four similar markets in the near future.

THE BOMBAY COTTON MARKETS BILL.

41. A Bill drafted on the lines recommended by the Central Cotton Committee was introduced in the Bombay Legislative Council in July 1927 and referred to a Select Committee. The Bill was finally passed during September and, as will be seen from the text of the Bill (Appendix IX), no changes in principle have been made; such alterations as have been effected during the passage of the Bill have taken the form of wider provisions for consulting local opinion. The new Act follows the Berar Cotton and Grain Markets Law in several respects with the important difference that the Market Committees will contain adequate representation of the growers. The Central Cotton Committee recommended that the "market proper," i.e., the area in which the Market Committee should exercise jurisdiction as distinct from the market yard, should be defined in the Act itself and not by Statutory Rules as in the Berar Cotton and Grain Markets Law. In the

Bombay Cotton Markets Bill the Berar model, however, has been followed, hence it is extremely important that the rules under the Act should be so drafted that the Market Committees will have power to see that their rules regarding weighments and allowances are observed whether weighments take place in the market yard or outside

42 The changes in the Central Provinces and Berar Market Rules foreshadowed in last year's report have not yet been made though it is understood that a reference has been made to Market Committees. It is hoped that this question will not be further postponed as evidence of unsatisfactory procedure in certain Berar markets and of the ignoring of certain existing rules is accumulating.

MARKETING OF IMPROVED VARIETIES OF COTTON.

43 The Committee has continued through the medium of the Technological reports on spinning trials and by pamphlets giving details of the areas and estimated production of improved cottons, to provide the cotton trade with information of the progress made in the establishment of new varieties. Certain improved cottons notably the best Punjab American (when grown on well known estates) Surat 1027 and to a less extent Dharwar No 1 and Gadag No 1 Upland reach Indian mills pure, and there is little doubt that the local competition for the best Cambodia cotton produces a similar result. Other cottons however such as Nandyal 14 (improved Northern) and Hagari 25 (improved Western) though sold locally at a premium are reported to be used by merchants for raising the general standard of the local cotton and not to be sold pure. It must be emphasised that, generally speaking the grower will not get the full premium for an improved cotton unless it reaches the consumer unmixed. Hence the Committee attach considerable importance to placing before consumers the information referred to above.

44 The supply of type bales of such cottons to three cotton exchanges, viz., the East India Cotton Association, Liverpool Cotton Association and Manchester Cotton Association has been continued but the Punjab American types were omitted in view of the small supply and unsatisfactory character of the 1926 crop due to an unfavourable season. These types enable merchants and spinners alike to see what cottons are available and to compare the genuine article with the private types offered to them. Every step which can be taken to secure adequate premiums to the grower assists in the extension of the new types till they entirely cover certain definite areas—an objective which both the Agricultural Departments and the cotton trade desire to see attained. It must be recognized by English and foreign users of Indian cottons that such improved cottons as Surat 1027, though produced in commercial quantities, are in good and regular demand by Indian mills. Hence, save in exceptional years, exporters are hardly likely to ship these cottons, which find a ready local market, except against specific orders. The type bales referred to above afford consumers an opportunity of placing such orders.

MEASURES TO PREVENT THE INTRODUCTION OF THE MEXICAN BOLL-WEEVIL.

45. Matters connected with the fumigation of American cotton have occupied the attention of the Committee throughout the year. As already stated, the imports for the 12 months ending August 31st, 1927, amounted to 324,585 bales which is far in excess of any previous imports on record. The capacity originally provided for was a maximum of 1,200 bales per day, and this fact was widely advertised. With the increase of arrivals it was found necessary to increase the capacity of the plant, additional Liston machines and gas-tight hatch covers were provided by Government and additional barges arranged for until, in June 1927, the daily fumigating capacity had been raised to over 3,000 bales, the highest number actually dealt with in one month being 62,062 bales in the month of May. From March onwards most of the cotton arrived in specially chartered steamers carrying some 20,000 bales each and, owing to delays in sailing and steamers failing to arrive at the advertised time, delays were inevitable. This was particularly the case in April when the uncertainty of the future of the lighterage contract arrangements made it impossible to extend the fleet of barges as rapidly as was desired. The proximate cause of the 'jam' was the non-arrival of steamers advised for early March (when the fumigation plant was actually idle on many days) until April and May. All arrears of cotton were cleared by the commencement of the monsoon but one steamer, work on which started on June 14th (only six days after her arrival), was held up a week on account of bad weather which made unloading impossible. From May it was decided in consultation with the Bombay Port Trust, to transfer fumigation operations to Prince's Dock where three large sheds and ample wharf capacity were provided by the Trustees, thus greatly facilitating both fumigation and the delivery of fumigated cotton. As with the increased fleet of barges and larger equipment the landing of cotton in quarantine was not found necessary, the monsoon extra fee was not levied either by Government or the Port Trust, only the reduced cold weather fee of Rs. 3-1 per bale being charged. The Local Sub-Committee devoted much attention to the reduction of expenses in connection with fumigation and to the improvement of the procedure. As a result of the economy arising from the handling of large quantities and from the improved fumigating routine which experience rendered possible, the Committee were able to recommend the Government of India to make a further temporary reduction of the fumigation fee on cotton fumigated between November 1st, 1926, and July 1927, and to make a refund of seven annas per bale.

46. The Committee further considered, at the commencement of the season, a representation from the Bombay Millowners' Association that the lighterage rates (which form the biggest item in the fumigation charge) were capable of substantial reduction. An analysis of the various items concerned did not indicate any large scope for reduction but in view of the size of the imports, Government were advised to terminate the existing contract as soon

as this could be done under the existing agreement and to put the contract up to open tender, the new rate to be fixed for three years. This was done and a new contract entered into from June 1st. The basic rates under the new contract were identical with those previously in force but certain modifications in the conditions which will lead to an economy in future working were secured.

It will be seen that the system of fumigating with hydrocyanic acid gas in barges using the Liston fumigator has proved satisfactory and elastic. It has the important advantage of keeping capital expenditure down to a minimum—a very important consideration in dealing with a fluctuating trade the future course of which it is impossible to forecast.

47. At the instance of the Bombay Millowners Association who represented that the fumigation of American cotton would cost the Indian textile industry some ten lakhs in the current year the Committee again examined the question as to whether it is necessary to insist on the fumigation of imported American cotton. In view of the doubts that were expressed as to the possibility of the boll weevil reaching India alive they asked the Government of India if actual experiments could be undertaken to settle this point beyond doubt. The question was very fully examined and it was found that the danger inherent in experiments which involved the bringing of live boll weevils to India was too great to be risked and that it was impossible to devise safeguards which would ensure that the experiments would not end in disaster. The Government of India informed the Committee that though they would have gladly seen the scientific aspect of the question fully investigated it was not possible to authorise the proposed experiments. The Committee at a later meeting considered that the latest information as to the time which the active weevils could survive without food made the experiments unnecessary. The recrudescence of serious boll weevil damage 927 after a period of three years of relatively absolute necessity of adequate measures to

PREVENTION OF THE INTRODUCTION OF FOREIGN INSECT PESTS IN IMPORTED COTTON SEED

48. The Committee in January 1926 recommended to the Government of India that commercial importations of foreign cotton seed into British India should be entirely prohibited and that in future imports should be limited to cotton seed required for experimental purposes when ordered by certain officers specifically empowered and then in quantities not exceeding 1 cwt through the Port of Bombay and subject to inspection and disinfection. It was also recommended that the co operation of all Maritime States should be secured in this policy.

A conference with representatives of five of the Kathiawar States was held in January 1927 as a result of which it was decided, on the advice of the Imperial Entomologist, that no restriction on the imports of Persian *lappas*

for ginning at Kathiawar ports was necessary. The representatives of the States undertook to maintain their present prohibition against foreign cotton-seed but asked for facilities for the importation of East African cotton-seed in the future should necessity arise in a year of scarcity. It was decided that the cost and efficacy of heat treatment for this purpose should be investigated by the Committee since the importation of East African cotton-seed into the Porbander and Bhavnagar States in years of scarcity might be a great boon to Kathiawar States. In such years a large import of cotton-seed for cattle feeding is necessary and African seed can be landed at approximately half the cost of Khandesh cotton-seed.

COTTON STATISTICS.

49. *Rail-borne Trade returns for cotton.*—At the request of the Committee, the Government of India undertook to re-institute the rail-borne trade returns for cotton and from October 1926 a monthly statement of the cotton exported from each internal trade block has been compiled and published in the *Indian Trade Journal*. It has been ascertained that statistics of exports alone do not provide the data necessary for an independent estimate of cotton production, which is the object of the returns, and the Government of India have been requested to re-introduce statistics of imports into each trade block.

50. *Cotton Press returns.*—The returns of cotton pressed have been of great value in testing the accuracy of the estimates of cotton production as well as furnishing the trade with reliable information of the progress of the crop. In connection with the latter feature it may be observed that though it is impossible to publish press returns classified by trade varieties (except for Madras) an examination of the detailed returns for individual blocks (as published in the *Indian Trade Journal*) enables a very fair estimate to be formed of the progress of ginning of the more important growths.

A complete check on Indian cotton production will not be possible until all Indian States have introduced compulsory press returns. Enquiry has shown that the discrepancies between the forecast of production and the quantities of cotton pressed are due to some extent to imports of cotton from Indian States into British India for pressing and to a less extent to imports from one Province to another. Nevertheless, the returns have enabled Directors of Agriculture to locate important sources of error and to take steps for their correction. The total discrepancy for British India was 298,000 bales—the crop being under-estimated to this extent—and it is probable that the actual error was in the neighbourhood of $1\frac{1}{2}$ to 2 lakhs of bales after making allowance for imports from Indian States. In Berar alone the discrepancy was 229,000 bales but it is believed that some 80,000 to 100,000 bales represent imports into the Province. The estimate of the United Provinces crop was 63,000 bales (25%) above the total of the press returns and consumption of loose cotton in mills: even allowing for village consumption on a scale considerably higher than the conventional figure adopted in the forecasts it is clear that the crop did not come up to expectations.

51 *Cotton Forecasts*—The application of the cotton press returns to the testing of the estimate of cotton production has brought to light the fact that in several instances important changes in the character of the crop have become known *after* the receipt of the report on which the final (February) cotton memorandum is based and that there is no machinery at present for taking advantage of such knowledge when the supplementary all India forecast is issued in April. The April memorandum was introduced in 1921 (on the recommendation of the Indian Cotton Committee of 1917-18) and is mainly concerned with the final figures for the Madras crop. An examination of the subject showed that there was equal need for a fifth regular forecast in the Southern and Gujerat divisions of Bombay as the crop is still immature when the reports for the February memorandum are sent in. The Committee have therefore represented to the Government of India that a fifth provincial cotton memorandum is required for the Bombay Presidency. In regard to other Provinces it has been proposed that any changes in the character of the crop which come to light after the February memorandum is compiled should be reported to the Director General of Commercial Intelligence and Statistics in order that revised figures may be included in his April memorandum.

52 *Imports of American cotton*—In view of the large imports of American cotton which took place in 1927 and the obvious need for dependable estimates of such imports, the Committee organised a system of voluntary advices from importers of American cotton purchased for India and since the 28th of April has published a weekly circular stating the total amount of cotton purchased for arrival during the season, the quantity arrived and the quantity at sea for India. Statistics of arrivals were compiled from the fumigation records and advices, estimates of cotton at sea from the compulsory advices required by the notification under the Plants Diseases and Pests Act which were checked from telegraphic reports of cotton shipped from American ports. Importers' voluntary advices, the details of which were strictly confidential, proved to be very accurate on the whole and naturally facilitated the fumigation arrangements as well as the compilation of the statistical circulars referred to above.

53 *Cotton consumption*—The Committee has continued to publish a monthly statement of the amount of *Indian* cotton consumed in Indian mills based on the returns received from mills in British India under the Cotton Cess Act and direct returns received from Indian States.

54 *Collection and supply of information*—As in past years a note on the recent progress in the introduction of improved varieties of cotton was contributed to the *Bombay Cotton Annual* published by the East India Cotton

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tion of one annual publication containing all important statistical information on cotton production and consumption such information will most easily reach those able to utilise it.

55. The Committee is again indebted to the British Cotton Industry Research Association for the supply of their weekly summary of current literature in which abstracts appear of all work published in connection with cotton growing and cotton technology and reference is made to the scientific work bearing on these subjects, and also for the supply of copies of the Shirley Institute Memoirs.

To the Empire Cotton Growing Corporation the Committee is also indebted for the supply both to the library and to members of the Committee of copies of their own proceedings, of special reports obtained by them on cotton prospects in other parts of the Empire and of the *Empire Cotton Growing Review* which is published quarterly. They have also supplied us with a considerable amount of information in regard to special cotton legislation in other countries.

The Committee has in addition a large circle of Government Departments and public bodies interested in cotton, both within and outside the Empire, with whom an exchange of publications is made.

PUBLICATIONS.

56. The following bulletins and pamphlets have been issued during the year under report :—

Report on an investigation into the finance and marketing of cultivators' cotton in Khandesh.

Report on an investigation into the finance and marketing of cultivators' cotton in North Gujarat.

Report on an investigation into the finance and marketing of cultivators' cotton in Berar.

Improvement of primary cotton marketing. (Pamphlet.)

Technological Reports on standard Indian cottons, 1923-26. (Technological Series No. 3.)

Index to publications of the Imperial Department of Agriculture in India dealing with cotton, 1906-26.

Effect of watering on cotton. (Technical pamphlet.)

The damage caused to cotton by watering. (Pamphlet in English, Hindi, Marathi and Gujarati.)

The effect of temperature and humidity on cotton spinning with particular reference to conditions in Bombay. (Technological Series No. 4.)

The effect of subjecting cotton to repeated blow-room treatment. (Technological Series No. 5.)

Publications issued by the Imperial Department of Agriculture

Use of hydrocyanic acid gas for the fumigation of American cotton by A James Turner and D L Sen (Bulletin)

A study of *Fusaria* common to cotton plants and cotton soils in the Central Provinces by Jiwan Singh,* M Sc, Assistant to the Mycologist, Central Provinces (Memoir—Botanical Series, Vol XIV, No 6)

Studies on *Platyedra Gossypiella* Saunds (Pink Boll worm) in the Punjab by Sohan Singh Bindra * M Sc (Memoir—Entomological Series)

A cross between Indian and American cotton by Mr B B Desai,* B Ag (Published in the *Agricultural Journal of India*)

The system of sending to the *Agricultural Journal of India* abstracts and notes on matters of use to agricultural officers and others engaged on cotton work was continued

SECRETARY'S TOURS

57 Visits were paid to Madras, Coimbatore, Nagpur, Indore, Cawnpore, Lyallpur, Khanewal, Delhi, the Hyderabad State, Dharwar, Poona and Karachi in connection with the work of the Committee

FINANCIAL

58 The financial year of the Committee runs from April 1st to March 31st and this does not correspond with the cotton year ending August 31st with which this report deals. Expenditure during 1926-27 amounted to approximately Rs 6,10,000 compared to Rs 6,94,000 receipts from the cotton cess but it may be noted that cotton cess receipts for the 12 months ending August 31st, 1927, amounted to Rs 5,90,482 only. Owing to delay in starting work on two new schemes expenditure in 1926-27 was considerably lower than was anticipated. For the current year the estimated expenditure is Rs 8,00,000 as compared to estimated cotton cess receipts of Rs 6,00,000. The balances accumulated during the earlier years, when the cotton cess was levied at four annas per bale and expenditure was lower, since research schemes could only gradually be developed, are now being drawn on steadily to enable additional research work to be financed. Care is taken that the Committee's permanent and semi-permanent commitments do not exceed the average annual income from the cess and investments.

* The paper describes work done by the author whilst a Research Student under the Committee

CHAPTER III.

RESEARCH.

59. The Committee provides for research work for the improvement of cotton growing by maintaining a Technological Research Laboratory at Bombay, by providing the bulk of the funds for the Indore Institute of Plant Industry, which is in effect a central research station for botanical and agricultural work, and by research grants to Provincial Departments of Agriculture for specific investigations.

TECHNOLOGICAL RESEARCH LABORATORY.

60. The report of the Director, Technological Laboratory, will be found in Chapter IV; as will be seen from that report considerable progress was made during the year both in the Research Laboratory and in the Spinning Laboratory and there has been a further increase in the extent to which Provincial Agricultural Departments have utilised the facilities afforded. The object of the Laboratory is to provide accurate spinning tests on Indian cottons, in order to assist in the production, introduction into cultivation and satisfactory marketing of improved types; to investigate the fibre characters of Indian cottons and to determine the relation of these characters to spinning value. As has been emphasised in the Committee's report on Cotton Research in India, the Technological Laboratory forms an integral part of the Committee's scheme of agricultural research. Though it is convenient to discuss separately the work of the Spinning Laboratory and the Research Laboratory, the two form an indivisible whole, for it is to the correlation of the results obtained in the two sections that we look for our most important results in the future. It will be seen that considerable progress has been made in the study of the cotton fibre and that for some fifty cottons which are spun annually, measurements are now made of no less than seven fibre characters. The provision of spinning tests has already added a new precision to the work of the Cotton Breeder; any increase in our knowledge of the relative importance of the different measurable characters of the fibre in determining the spinning value of a cotton would mark a very distinct further advance.

61. Of particular interest is the work carried out on what have been termed standard cottons and which are mainly those improved varieties which the Agricultural Departments have established on a considerable scale. Originally undertaken to provide the necessary basis for the testing of newer strains, the work has proved of practical value in several other directions. The results of accurate spinning trials carried out year by year are of considerable value in organising the marketing of improved cottons and are of great interest to the trade as well as to the Departments of Agriculture. The information which has been collected on seasonal variation

in quality is steadily growing in value for not only does such work provide an answer to the question as to whether any particular growth is maintaining its character or is deteriorating but it is hoped that an examination of the data which have been collected for certain climatic factors will throw some light on the causes underlying seasonal variation in quality. Whilst the tests on new cottons for Cotton Botanists provide the information they require in the course of their work and enable them to simplify the sorting of the mass of material which they have to handle, the work on standard cottons—both in the Research Laboratory and the Spinning Laboratory—is directed to the extension of our knowledge of Indian cottons generally.

62. The work of the Technological Laboratory is essentially directed to the improvement of the raw material, that is to say, the various problems dealt with are attacked from the standpoint of cotton-growing. Nevertheless a good deal of work has been necessary to determine the conditions which must be satisfied in order that spinning tests may be sufficiently accurate for our purpose; in the course of such work in the Spinning Laboratory some extremely interesting results from the spinning and testing standpoints have been attained. Some of these results have recently been published in bulletin form and it will be seen that they have a distinct bearing on the utilisation of existing growths of Indian cottons.

THE INDORE INSTITUTE OF PLANT INDUSTRY.

63. The Annual Report of the Director will be found in Appendix XI and elsewhere in this report appears some illustrations of the Institute. It will be seen that general investigations into the botany, physiology and cytology of Indian cottons are in progress and that in addition certain problems particularly connected with cotton-growing on the black soils of Central India are receiving special attention. The work of the Institute has aroused much interest locally and two more Indian States, viz., Tonk (Rajputana) and Bijawar (Central India) have undertaken to contribute to the funds of the Institute which is financed partly by grants from the Central Cotton Committee and partly by contributions from ten Indian States. In addition to the study of the different varieties of Indian cottons the question of improved methods of cultivation has been taken up. A method has been worked out for the eradication of *Kans* (*Saccharum spontaneum*) which is by far the most serious weed of black cotton soils in the North Peninsular India and which has been responsible for large areas of land going out of cultivation. Much progress has also been made with the study of methods of preparing cheap organic manures for the cotton crop. Seven research students appointed by the Central Cotton Committee (two senior and five junior) were working at the Institute during the year; one of the senior students has recently been appointed to the Bombay Provincial Agricultural Service.

AGRICULTURAL RESEARCH GRANTS.

In the previous chapter reference has been made to the Committee's expenditure on the promotion of cotton research and some further details will be found in Appendix XII. The thirteen provincial research

financed by the Committee are distributed as follows:—Madras 2, Bombay* 5, United Provinces 1, Punjab 2, Central Provinces 2 and Sind 1. By subjects these schemes may be classified as follows:—Cotton-breeding investigations 5, cotton diseases 2, cotton entomology 3 and cotton physiology 3.

65. Dealing first with the cotton-breeding schemes, it will be realised that it is as yet much too soon to expect to see new cottons in cultivation. The time required for the actual research work varies with the nature of the particular problem undertaken. Each generation takes a year and when it is stated that the *third* is the earliest possible generation when a straightforward selection could be ready for multiplication and that in some cases eight generations of a hybrid may require study before a new strain can be fixed, the time necessary to secure practical results will be appreciated. It should be added that three generations are required to multiply up a selection to any appreciable field scale but extended field-testing and spinning tests can go on concurrently with this last stage. It should perhaps be emphasised that the improved cottons now in general cultivation on literally millions of acres in India, e.g., Cambodia, Surat 1027, "Company" Karunganni, Punjab-American, Gadag No. 1, Dharwar No. 1, Hagari 25, and several others which are only on the scale of a few thousand acres, are the result of work commenced many years ago in the early days of the Agricultural Department. But that work was successful and has changed the character of the Indian cotton crop and we can have equal confidence in future results if work is continued on sound lines. It should also be emphasised that, in respect to cotton-breeding particularly, the Central Cotton Committee is supplementing the work of the Provincial Agricultural Departments, many of which are doing a great deal more with their own funds than from ours. On the other hand our cotton-breeding schemes have an advantage in that, in all cases, they are a development of work that had already been commenced so that some time has been saved. It has been felt desirable to add this general explanation as the extent to which the agricultural investigator is limited by the fact that usually only one generation of a crop can be produced annually is not always fully appreciated. Hence the summaries that follow, whilst they show in what way the Committee's grants are being used, can only give the most general indication of the progress which has been achieved. But the most careful discussion of the annual reports on the various schemes by the Agricultural Research Sub-Committee shows that the work has been well planned and that it is being carried out thoroughly and skilfully.

66. *The Madras Herbaceum Scheme*.—Annual grant averaging Rs. 12,000 per annum for five years—present grant Rs. 13,000. The object of this scheme is to obtain, by the method known as pure-line selection, pedigree strains of the best components of a mixed crop. The *Herbaceum*

* Presidency Proper—The Dharwar Scheme has been counted as two, as two separate and distinct investigations are in progress though under one senior research officer.

(or Uppam) type of Madras cottons possesses certain desirable agricultural characteristics and the varieties under study are those which thrive on soils somewhat deficient in moisture and in a tract with a distinctly light rainfall. The object is to select types with good staple and eventually to multiply for distribution the most profitable type. Similar work by Mr Hilson some years ago produced the improved type of Westerns known as Hagari 25 which is a recognised success. Much of the spade work has now been got through and several strains have now reached the stage when field trials and spinning tests can be undertaken. A natural hybrid between *G. herbaceum* and *G. indicum* (Uppam x Karunganm) is also being studied and purified.

67 *Central Provinces and Berar Botanical Research Scheme*—Annual grant averaging Rs 17,200 per annum for five years—present grant Rs 25,500 per annum. Prior to the initiation of the Committee's research scheme in 1923 Dr Youngman had been engaged as Economic Botanist, Central Provinces and Berar, on the study of the cottons of the Province with the object of obtaining profitable cottons with a better staple and a higher resistance to the cotton wilt disease. Concurrently work had been started on methods of improving the yield per acre. As a result of the Committee's grants, a special cotton staff has been arranged and Dr Youngman devotes his whole time to the botany of cotton and certain rotation crops. A considerable proportion of the cost of the work is met by the Central Provinces Department of Agriculture, the Committee's grant being applied to certain specified items of expenditure. The field covered is wide involving as it does a detailed study of many forms of Indian cottons and of the possibilities of producing new types by hybridisation. Reference may be made, however, to certain practical results which have already emerged. Two new types of cotton, known for the present as Verum 262 and Verum 265, have been found to possess several of the desired qualities. Spinning tests at the Technological Laboratory show that they are suitable for the production of 20s (warp) counts, the ginning percentage is reasonably high, these strains show considerable resistance to the wilt disease and the agricultural yield is satisfactory. During the present cotton season they are being grown by cultivators on a scale of 750 acres and arrangements are being made for the organised marketing of the produce in order that the true commercial value of these cottons may be demonstrated. Botanical work on Chanda Jari, a variety of *G. indicum*, has resulted in the isolation of a pure strain free from the tinge of colour which characterised the local variety.

68 *Punjab Botanical Research Scheme*—Initial grant Rs 29,300, recurring grant Rs 45,000 per annum.

The Committee has provided a Cotton Research Botanist (Mr Trevor Trought, M.A., previously Senior Botanist to the Egyptian Ministry of Agriculture) and a grant for a special staff and equipment for the study of a number of problems connected with cotton growing under Punjab Canal Colony conditions. Very substantial additional expenditure has also

been incurred by the Punjab Government and in this way a special botanical section for cotton has been established. Work is in progress both on American and *desi* cottons but, at present at any rate, attention is mainly concentrated on various problems connected with Punjab-American cotton. As the result of the earlier work of the Agricultural Department, Punjab-American cotton now covers an area of 750,000 to a million acres annually and indeed is the most outstanding example of the establishment of a large area of long-staple cotton in India. In many years the cotton is of excellent quality and the yield satisfactory but in certain years, notably 1919, 1921 and 1926, due to an unfavourable season, both yield and quality have been unsatisfactory. The question of these occasional failures and the general problem of improving the yield and quality of the crop are being studied from both the varietal and physiological standpoints and some further information has already been obtained on the causes of the low yields of 1926. Arrangements have also been made for "rogueing" the seed areas on various large estates which supply a large proportion of the American cotton seed for the Canal Colonies in order that the seed of the 4F, 285F and 289F varieties which is issued for general cultivation may be as true to type as possible.

69. *Dharwar (Bombay) Cotton Breeding Scheme on Upland Cottons.*
—Annual grant* Rs. 12,550.

If we except dry Cambodia in Madras, the future of which may still be considered doubtful, the Dharwar Upland area† is the one area in British India where the American type of cotton is grown on a commercial scale as a *rain-fed crop* and is the only direct result of the introduction of American cotton about 1840. The reason why the Upland type persists around Gadag in competition with Kumpta is that it has a shorter growing season, can be sown later and so suits the climate of this tract better than Kumpta. The Agricultural Department have already succeeded in replacing the old mixture by a pure Upland strain, Gadag No. 1, which is a cotton of exceedingly useful staple. Upland cotton being firmly established in the tract it is obviously desirable to grow as good a stapled cotton as possible. The limits of ordinary selection having apparently been reached it was decided to attempt to secure further improvement by hybridisation using Sea-Island cotton as a parent—not because it is expected to obtain Sea-Island staple but because the history of American cottons suggested that this course was desirable. Work had been started by the Agricultural Department's Cotton Breeder and was taken over by the special staff paid from the Committee's grants. It is as yet too early to say more than that the results are promising. The work has now reached the fifth hybrid generation and there are grounds for believing that a cotton with a much better lint than Gadag No. 1 and with an agricultural habit suitable to the tract has been obtained.

* Includes half the pay of the Botanist (Mr. Kulkarni) who is in charge of both this and the Cotton Wilt Scheme.

† The Dharwar-American area extends into the Hyderabad and Mysore States and is not limited to the Dharwar District of the Bombay Presidency.

70 *Khandesh*—Annual grant Rs 5,000 per annum for five years from 1925-26

By their grant to this scheme the Committee has enabled an adequate staff to be provided for the completion of work that has been going on for some years. Of several selections from a hybrid, two have been obtained which combine a good ginning percentage with satisfactory lint quality. Spinning tests have been regularly conducted annually at the Technological Laboratory and show that these strains are capable of spinning 20s counts as compared to the 8s to 10s usually obtained from Khandesh cotton. One strain has been distributed tentatively to cultivators, both are now undergoing exhaustive field trials on the Government farm and on cultivators' fields. The all-important question of the relative yield per acre of these cottons has not yet been settled finally but they are exceedingly promising.

71 *Cotton Diseases*—Grants have been made for the study of the wilt disease of cotton at Dharwar and Nagpur. This is the only generally important disease of cotton in India, and, though it had been known and worked on for a number of years, there was little definite knowledge of remedial measures when the Committee decided in 1923 to give two grants for its further investigation. It presents perhaps the most baffling and difficult problem which has been undertaken but the loss caused by this disease throughout a large portion of the black soil areas, representing a large proportion of the total Indian cotton area, is so large that further investigation seemed urgently called for.

72 *Dharwar*—Annual grant* Rs 12 450

No attempt to summarise the work at Dharwar will be made here as a Memoir is under preparation. In two directions practical results have been achieved. It has long been recognised that the use of resistant strains is one practical method of reducing the loss from this disease and the Bombay Agricultural Department's Cotton Breeder has been engaged on work on *Kumbla* cotton to this end for some years. The Mycological staff have worked out methods of testing relative susceptibility and have co-operated in the testing of the Cotton Breeder's strains with the result that some new strains of good staple and high disease resistance are now available. But the use of such strains is not a final solution of the problem and work in other directions has been continued. The determination of the thermal death point of the fungus has indicated the possibility of control measures and field experiments to test this point are in progress.

73 *Central Provinces Cotton Wilt Scheme*—Annual grant Rs 5,800 (average). The work on this investigation is being carried out by Mr J F Dastur, Mycologist to Government, Central Provinces, the Committee's grant providing for additional assistants and equipment. At Nagpur the

* Includes half the pay of the Botanist (Mr Kulkarni) who is in charge of the and the Dharwar Cotton Breeding Scheme

question is being investigated more from the physiological aspect and some interesting information has been obtained as to the course of the disease. There are indications also that the wilt problem in the Oomras tract differs in certain respects from that in the Kumpta cotton tract.

COTTON ENTOMOLOGY.

74. *The Pink Boll-worm*.—The Committee have made grants for two investigations on the Pink Boll-worm which is undoubtedly the most destructive cotton pest in India.

United Provinces.—Total capital grant Rs. 54,000, present annual grant Rs. 16,000.

The results of Mr. Richard's work at Cawnpore were summarised in the last Annual Report of the Committee: these have been fully confirmed by further work. It has definitely been shown that if the United Provinces cotton crop is protected from this pest the improvement both in yield and quality is great; the small scale cage results have been confirmed on a field scale under cultivators' conditions. Two further years' work is required to clear up certain details but it has been practically established that if *all* the cotton-seed of a sufficiently large tract can be treated by heat the pest can be controlled. The logical development of these results is that all ginning factories in future should be equipped with heat machines for the treatment of all seed (whether intended for sowing or not). It has been shown that the improvement of yield and quality to be expected from the control of the Pink Boll-worm would add at least 25 per cent. to the value of the United Provinces cotton crop. As such control of the Pink Boll-worm would mean the practical elimination of stain from Bengals cotton, this is an advance which every member of the cotton trade and industry would appreciate. The benefit to the grower has been calculated to be anything from Rs. 30 per acre upwards when both yield and quality are taken into account. The cost of treating the cotton-seed produced per acre is not likely to exceed three annas so that even if only a portion of the anticipated profit is realised the benefit to cotton growing would be enormous.

75. *Lyallpur Research Scheme*.—Initial grant Rs. 6,000, annual grant Rs. 17,000.

An investigation carried out by one of the Committee's research Students (Sohan Singh Bindra), the results of which are now being published in a Memoir of the Imperial Department of Agriculture, has added considerably to our knowledge of the incidence of this pest in the Punjab. The Pink Boll-worm is at present definitely a serious pest in the South-Eastern Punjab, less important elsewhere and relatively unimportant in the Canal Colonies. There is, however, no certainty that it will not increase in the last area though there are indications that it may be limited by climatic factors. The object of the scheme is to ascertain what limitations actually exist and to obtain full and accurate knowledge of the status of this insect in the Punjab. The scheme is complementary to and not a repetition of the work at Cawnpore which has been referred to above.

76 *The Earias Boll worm—Surat Investigation*—Annual grant Rs 15,000

The Spotted Boll-worm is the principal pest of cotton in those parts of India unaffected by the Pink Boll-worm. The investigation at Surat has definitely shown that whilst the importance of this pest in South Gujarat may have been exaggerated in the past it is certainly responsible for rendering the crop later than it otherwise would be. Whether, apart from this it occasions any actual loss of crop at Surat is doubtful since, with the exceptionally long growing season which characterises that district, the plant appears to recover. But it is not certain that this holds true in all seasons or in other parts of Gujarat and there is little doubt that the pest acts as a brake, preventing an increase of yield being attained. Various suggested control methods proved disappointing but the maintaining of a soil mulch which prevents the successful pupation of the larvae, a method which has recently been worked out is exceedingly promising. The further knowledge of the life history of this pest in relation to the cotton crop which has been acquired during the course of this investigation may prove of value in other parts of India where the shorter growing season gives the plant less time to recover from damage in the early stages.

COTTON PHYSIOLOGY

77 *Surat Research Scheme*—Annual grant Rs 25,000.

The first investigation into the physiology of the cotton plant to be financed by the Committee was the Surat Research Scheme on the causes leading to the shedding of buds, flowers and bolls of the cotton plant in Gujarat. The yields of cotton obtained in Gujarat compare favourably with yields from unirrigated cotton cultivation in any other part of India, the plant grows sturdily and well but the proportion of flower buds that eventually form mature bolls is surprisingly small being only some 7 to 10 per cent. It appears that there is enormous scope here for the improvement of yields if the shedding could be reduced. Part of the shedding is due to the Spotted Boll worm—especially the early shedding—but it has been proved that this is not the significant factor. The first two years' work showed that the loss of potential crop was not due to pathological reasons but was a plant nutrition problem. Work on this aspect of the problem was developed and it has been found that by various artificial means the number of matured bolls per plant can be doubled. From these results improved methods of cultivation are being worked out and this aspect of the work will receive special attention during the coming year.

78 *Madras Pempheres and Physiological Scheme*—Annual grant Rs 55,000 (average)

As stated in last year's report the object of this scheme is to provide for the study of a group of related problems. Work on bud, flower and boll shedding has been carried to a certain stage by the Cotton ~~Spinning~~ to the Madras Government in the course of other work and the ~~same~~

published ; this work will be continued and extended. The cotton stem weevil, *Pemphres affinis*, threatens to be a limiting factor on cotton production at Coimbatore and there is a risk of its becoming a major pest in other parts of India. The life-history has been worked out already but no direct control measures appear possible. An important line of enquiry is the resistance to attack and power of recovery shown by certain strains of cotton, and investigations from both the botanical and chemical aspect have been arranged for. Concurrently certain further entomological data will be collected with special reference to the utilisation of the Madras Pest Act against this insect. Difficulties in securing the senior staff have delayed work on this scheme but in the meantime some progress has been made with the biochemical work by one of the Committee's research students working under the joint direction of the Agricultural Chemist to the Government of Madras and the Cotton Specialist, Madras.

79. *Sind Research Scheme*.—Annual grant Rs. 20,000. Work on this scheme started on July 9th, 1927, when Mr. B.M. Dabral, previously Assistant Physiological Botanist under the Committee's Research Scheme at Surat, was posted to the Sakrand Research Station. The Bombay Government research station at Sakrand is undertaking a series of investigations into the various problems connected with the transition of the canal system from inundation to perennial irrigation and work on cotton forms an important part of the programme of the station. The Committee's grant provides for a Cotton Physiologist and staff to investigate certain problems connected with the water requirements and general physiology of the cotton plant under canal colony conditions.

80. *Punjab*.—Reference to the physiological work in progress at Lyallpur has been made in connection with the Punjab Botanical Scheme. The work in progress on the causes leading to the non-dehiscence of the anthers of the cotton flower at certain periods of the year promises to yield important practical results.

81. The Central Cotton Committee's policy in regard to Cotton Research has been to fill the gaps which exist in the work undertaken by Provincial Agricultural Departments but in doing so to avoid purely local problems and to devote their funds to investigations which have a definite bearing on Indian cotton-growing as a whole. The pursuance of this policy has led them to finance some of the more difficult and baffling problems connected with the improvement of cotton-growing and it follows that in some cases results will be slow in appearing. But the solution of these problems is necessary if some of the greatest limitations on increasing the monetary return per acre of cotton are to be modified or removed.

82. The abstract of the Committee's expenditure on Cotton Research up to March 31st, 1927, which will be found in Appendix XIII, shows the distribution of the various grants and the nature of the expenditure met from them. All purchases from the Committee's grants remain the property of the Committee and a record of all such apparatus and equipment is maintained so that as time goes on transfers of equipment from one

scheme to another may be effected when apparatus or equipment is no longer required for the investigation in connection with which it was originally purchased.

RESEARCH STUDENTS

83 No less important than the provision of funds for Cotton Research is the devising of means for securing a corps of qualified scientific workers with experience of cotton research. It is with this end in view that the Committee introduced its scheme of Research Studentships for graduates of Indian Universities under which young men who have the necessary scientific training and a bent for research may be trained in the application of scientific methods to research on cotton under more experienced investigators working in different parts of India. From September 1923 when the first appointments were made to August 31st, 1927, expenditure on this branch of the Committee's work has amounted to Rs. 1,02,395. The value of each studentship is Rs. 150 per mensem (with a local allowance for students at the Technological Laboratory) and the normal term of appointment is two years which is frequently extended to a third year. A few senior research studentships of higher value are given from time to time. The total number of research students appointed is 21 of whom 18 are still under training, 14 not yet having completed their two-year period. Including one Senior research student, twelve students have received appointments in connection with cotton research and 17 others have been definitely selected for appointments which they will take up shortly; two other students have had suitable appointments offered to them but preferred to take up educational work. Three students returned without completing their term. It will be seen that having due to certain initial wastage has been small and that those students who have completed their training have formed a useful addition to the cadres of scientists engaged on cotton research. Details of all students appointed to date will be found in Appendix XV.

84 The time has not yet come for a general survey of the work and in any case it has been the duty of the Committee, as a representative body, viz., the Royal Commission on Agriculture, to report on the progress of the work. It may be said the Committee has not yet been able to effect any marked improvement of cotton marketing, but it has been able to secure the grower and they have paid the price of the cotton. The Committee has also been able to secure the price of the cotton and their influence they have been able to secure the price of the cotton. Cultural research, so far as it goes, has been able to secure the price of the cotton. Of uncertainty and financial difficulties, the Committee has been able to secure the price of the cotton. The Royal Commission on Agriculture has been able to secure the price of the cotton. It is believed that the experience of the Committee has been able to secure the price of the cotton. The form of organisation will be able to secure the price of the cotton. The report enables a figure to be put on the cotton. The development in India.

CHAPTER IV.

ANNUAL REPORT OF THE DIRECTOR, TECHNOLOGICAL LABORATORY, 1926-27.

THE report is divided into three sections :—

- I. Spinning Laboratory.
- II. Research Laboratory.
- III. General.

I. SPINNING LABORATORY.

The Spinning Laboratory has been fully employed during the year under review. There has been an increase in the number of samples submitted by the Agricultural Departments; as a consequence, the number of tests which it has been possible to make on the standard Indian cottons has slightly decreased. The following table shows in summary form the distribution of the samples tested during the three years during which the Spinning Laboratory has been in operation :—



Technological Laboratory.

Sample Distribution List

39

Province	Samples			Totals 1924 27	Lots			Totals 1924 27	Yarn spun			Totals 1924 27.
	1924 25	1925 26	1926 27		1924 25	1925 26	1926 27		1924 25	1925 26	1926 27	
Bombay	18	26	22	66	36	52	44	132	152	132	387	
Punjab	14	1		15	26	4		30	14		120	
United Provinces	7		6	13	14		12	26		36	63	
Madras	2	19	48	69	1	38	96	138	108	266	386	
Central Provinces	2		3	5	3		6	9		18	26	
Burma		6		6		12		12	28		28	
Miscellaneous	3	5		8	3	10		13	30		33	
Totals	46	57	79	182	86	116	158	360	332	452	1 043	
Standard Cotton Tests	8	54	49	111	34	176	142	352	514	423	1,032	
Total Tests	54	111	128	293	120	292	300	712	846	875	2,075	

Note—Each sample of cotton submitted for test is normally divided into two lots, each of which is then spun into three different types of yarn

Tests for Agricultural Departments—The following is a statement of cottons tested for the various Agricultural Officers —

BOMBAY.

- (1) *Director of Agriculture, Bombay*—One sample of a hybrid cotton Sea Island x Gadag No 1 (Indian Central Cotton Committee's Cotton-Breeding Scheme)
- (2) *Cotton Breeder, Dharwar*—Eight samples of Dharwar cottons, six being new types for comparison with Dharwar No 1 and Gadag No 1
- (3) *Cotton Superintendent, Dharwar*—Two samples, one being ordinary Kumbta and the other a new type which is being tentatively distributed for district testing.
- (4) *Cotton Physiologist, South Gujarat, Surat*—Two samples of 1027 A L F grown under different conditions
- (5) *Cotton Breeder, South Gujarat, Surat*—Three samples, consisting of two new strains for comparison with local Broach
- (6) *Cotton Breeder, West Khandesh, Dhulia*—Six samples, consisting of two new strains grown in different localities for comparison with the corresponding Roseum cotton

UNITED PROVINCES

Assistant Economic Botanist, Cawnpore—Six samples, consisting of three new types—two of which were grown in different localities—for comparison with local Cawnpore cotton

MADRAS

- (1) *Assistant Cotton Specialist Kottipatti*—Seven samples of the strains for comparison with the
- (2) .. —(i) Ten samples of Cambodia strain 440 grown under various conditions (ii) Three samples of different Cambodia strains. (iii) Twenty samples, consisting of various cottons being subjected to comparative trials
- (3) *Deputy Director of Agriculture, III Circle, Bellary*—Four samples, two being new types, the others being local Mungari and Hagari 25 respectively
- (4) *Assistant Agricultural Demonstrator, Tiruppur*—One sample of Cambodia strain 295

CENTRAL PROVINCES

Economic Botanist, Nagpur—Three samples, two being new strains for comparison with local Roseum

MISCELLANEOUS

A comparison of saw ginned and roller-ginned cottons has been made for Surat 1027 A L F and Nanded (Bani) cottons.

The cottons which have been chosen as standard Indian cottons are those more or less recent Agricultural Department selections which have been introduced into cultivation on a commercial scale. The work on these standard cottons is of importance from several points of view. In the first place, it furnishes the necessary standards by which to judge new cottons; secondly, it provides Agricultural Departments not only with information which they did not previously possess of the capacities of the cottons but also with annual test-results showing to what extent quality has varied from that of previous seasons; thirdly, it provides the cotton trade with very valuable information which has a definite bearing on the marketing values of these cottons. Furthermore, through the combined work in the Spinning and Research Laboratories, the results of spinning tests and fibre measurements are being accumulated for various cottons, and it is by the investigation of these results that it is hoped to solve the problem of their inter-relationship.

The recent Bulletin "Technological Reports on Standard Indian Cottons 1923-26" includes the results of the spinning and other tests on the standard cottons for the 1925-26 season as well as for the previous seasons for which the several cottons have been tested; the results for one new standard cotton—Mollisoni, a Punjab *desi* cotton—are also included. A summary of the results of these tests is given on page 51.

In the new bulletin the method of indicating spinning value is discussed at rather greater length than previously. Two methods are referred to: the first involves the determination of the spinning performance of various cottons at some one definite count; the second method involves the determination of the highest count of standard warp yarn into which each cotton can be spun, as deduced from spinings of that cotton into a number of different counts. It is shown that the method adopted at the Technological Laboratory combines the advantages of both methods. Each sample is divided into two separate lots; each of these duplicate lots is then spun into three different types of yarn, so that the final decision as to the spinning capacity of a cotton is based on the test results for six different sets of yarns. In arriving at a conclusion as to the highest count of standard warp yarn for which the given sample is suitable, due weight is given to the performance of the sample during the various spinning processes, to the numbers of breakages on the ring frame, and to the yarn test results, chiefly those for counts,lea strength and twist. An extended discussion is included of the standards which have been adopted for twist and strength; figures for the count-strength products have also been introduced, in order to facilitate the comparison of strengths. A full explanation has also been added of the table showing the standard breaking loads which have been adopted for various counts of yarn subjected to the lea test, with a view to making quite clear the purpose of the table and the manner in which it is applied. A further addition in the new bulletin concerns the amount of waste made in the card. It is shown that the excess card room loss for samples of various weights over the loss sustained by a sample of 100 lb,

weight represents in each case the same absolute weight, viz., 0.1 lb., this value being given independently by the 10-lb. samples, the 5-lb. samples, and the 2-lb. samples, it is concluded therefore that 0.1 lb. of cotton is necessary to load the card. One other point is also brought out concerning the action of the card. It is shown that the yarns from the 2 lb samples almost invariably prove to be decidedly less neppy than yarns spun from larger samples. This is due to the fact that the card is cleaned after the passage of each lot of cotton, the cleaned card is at first able to extract practically all the nep from the cotton which passes through it, the amount of nep that appears in the web then gradually increases to a maximum, which is reached when about 1.5 lb. of cotton has passed through.

During the year a bulletin has been prepared on the effect of repeated blow-room treatment on certain baled cottons containing a large percentage of foreign matter. (Indian Central Cotton Committee Bulletin No. 10, Technological Series No. 5) Duplicate lots of three different cottons—Punjab-American 289F, Punjab American 285F, and Hagari 25 (Westerns)—were respectively given 2, 3 and 4 treatments in the Crighton opener. One of the cottons—289F—was also given a normal treatment in the Crighton opener, but successive samples of this cotton were passed through the scutching card. Each lot of each cotton was subjected to each treatment was then spun into three different counts of yarn. Observations were made of the behaviour of the cotton during working, and a record was kept of the number of breakages sustained on the ring frame during the spinning of each yarn. The results show that the effect of three or four treatments in the Crighton opener as compared with the normal two treatments is to increase the total waste by about three-quarters per cent for each additional treatment, otherwise the extra treatment in the Crighton opener makes practically no difference to the behaviour of cotton in spinning, to the appearance of the yarn—including the evenness and the neppiness—or to the strength of the yarn. The effect of additional scutching was very similar to that of additional Crighton opening. It is pointed out that the results relate to small scale tests, and that when cotton is being passed through in bulk somewhat different results might be experienced—in particular, if there should be a lack of uniformity in the flow of the cotton, such as to cause intermittent accumulation in the Crighton opener, damage to the cotton staple might ensue. References are also made to the possible effects of different beater speeds, different settings, and different formation of the grids of the opener. The chief conclusions drawn are:—(1) that so long as the cotton passes uniformly through the blow-room, repeated opening or scutching effects a slight improvement in the cleaning without detriment to the strength of the yarn; and (2) that once cotton containing foreign matter is pressed into bale form it may be very difficult, if not impossible, to remove the foreign matter completely, especially if it consists of fragments of seed-coat, so that the appearance of the yarn and its value suffer accordingly.

Another bulletin published during the year deals with the effect of temperature and humidity on cotton spinning, with particular reference to conditions in Bombay (Indian Central Cotton Committee Bulletin No. 9,

Technological Series No. 4). In this bulletin the climatic conditions which prevail in Bombay are considered at length, tables being given to show the mean temperature and mean relative humidity normally experienced for each hour of the day for every day of the year; a table is also given showing the frequency of occurrence of days of specified minimum humidity during the cold weather period of Bombay. Spinning tests were carried out on seven different cottons, each of which was spun in duplicate into three counts of yarn under three different sets of physical conditions of temperature and humidity. The spinning conditions are described as:—

(1) *Medium dry*, i.e., conditions obtained when the outside relative humidity is at its lowest; (2) *normal*, i.e., conditions such that the temperature is about (but not below) 80° F. and the relative humidity is about 65 per cent. (but never below 60 per cent.); and (3) *monsoon*, i.e., conditions in which the temperature is 90° F. and the relative humidity is about 70 per cent.

Observations were made as to the effect of the several physical conditions on (1) comfort in working; (2) workability of the material; (3) appearance of the yarn; (4) strength of the yarn. Each of the two lots of each cotton was spun into three counts of yarn under each set of conditions; and each of the yarns thus obtained was subjected to 50lea tests, 100 tests for single thread and extension, and 80 twist tests. The conclusions drawn from these tests are:—

- (1) for comfort, the normal conditions are more satisfactory than either of the extreme conditions;
- (2) for workability of the material, the medium-dry conditions are not quite satisfactory in the card room, but the normal and monsoon conditions are satisfactory throughout;
- (3) the yarn spun under medium-dry conditions is the least satisfactory in appearance, and that spun under the monsoon conditions the most satisfactory, but these differences practically disappear when the yarn is conditioned;
- (4) within the limits of temperature and humidity within which these tests were carried out, it is impossible to lay down any hard and fast rule as to the conditions (medium-dry, normal, or monsoon) which give rise to the strongest yarns, the differences for the most part being inappreciable;
- (5) in general, it may be taken that the processing of the material in cotton spinning and the quality of the spun yarn are not seriously affected by the spinning processes being carried out at relative humidities as low as 40 per cent.; but that, taking all things together, the normal conditions are probably best for carrying out cotton-spinning tests;
- (6) Bombay conditions are practically ideal for the processing of the material in cotton spinning.

Progress has also been made in two other directions referred to in last year's Annual Report. A number of cottons have been tested with a view to ascertaining whether the procedure adopted in the Spinning Laboratory of arranging the drafts from the card onwards so that the draft required in the ring frame for yarn of 30s counts is about six and to obtain other counts from the same rovings merely by changing the draft in the ring frame—yields very different results from those obtained when "balanced drafts" are used. A number of tests have also been made in connection with the investigation of the possible deterioration of cotton on storage. It is hoped that it will be possible to describe the results of these two investigations in the next Annual Report.

Another investigation which has been started during the past year concerns the effects of spinning speed on the yarn breakages and on the yarn. As pointed out in Technological Reports on Standard Indian Cottons 1923 26, when a given cotton was spun into a single count with more than one degree of twist the stronger yarn (that with the higher twist) was actually spun at a slower speed as shown by the front roller speed, than the yarn spun with a lower twist. This would be avoided if possible in general practice and the stronger yarn would be spun at the higher speed. The ring frame on which the yarn was spun is driven by a variable speed motor but the maximum speed possible had already been used in the spinning of the yarn with the lower twist. To correct this a special pulley was made of a larger size which would enable a higher maximum speed to be attained. This new pulley has been obtained. It appears desirable to use this higher speed whenever possible, as by this means the time taken to spin this higher speed spinning tests can be materially reduced. The investigation of the connection with the standard cottons, that, as was pointed out in the report, certain speed conditions during previous seasons, it was found that they had been altered for succeeding seasons, corrections were made in the standard might have been rendered invalid. For this reason the results of the 1926 27 season have been tested both at the lower and higher speeds in order to determine whether the conditions actually make any and if so what difference. The results obtained will be published in the next Annual Report.

Certain new methods have been adopted in the Technological Reports on Standard Indian Cottons 1923 26. Although this investigation has been continued, the results of the investigation are far from satisfactory. The investigation of the effects of spinning speed on the yarn breakages and on the yarn. As pointed out in Technological Reports on Standard Indian Cottons 1923 26, when a given cotton was spun into a single count with more than one degree of twist the stronger yarn (that with the higher twist) was actually spun at a slower speed as shown by the front roller speed, than the yarn spun with a lower twist. This would be avoided if possible in general practice and the stronger yarn would be spun at the higher speed. The ring frame on which the yarn was spun is driven by a variable speed motor but the maximum speed possible had already been used in the spinning of the yarn with the lower twist. To correct this a special pulley was made of a larger size which would enable a higher maximum speed to be attained. This new pulley has been obtained. It appears desirable to use this higher speed whenever possible, as by this means the time taken to spin this higher speed spinning tests can be materially reduced. The investigation of the connection with the standard cottons, that, as was pointed out in the report, certain speed conditions during previous seasons, it was found that they had been altered for succeeding seasons, corrections were made in the standard might have been rendered invalid. For this reason the results of the 1926 27 season have been tested both at the lower and higher speeds in order to determine whether the conditions actually make any and if so what difference. The results obtained will be published in the next Annual Report.

using 10-inch lengths in the twist testing machine. By this means it is possible to test a length ten times as great as was previously possible with the singles yarn, and further, the accuracy of an individual twist test is probably at least 100 times the accuracy of the previous tests on half-inch or one-inch lengths.

Another improvement concerns the determination of the single thread strength. The investigation of variation of the yarn on a bobbin referred to in "Technological Reports" has revealed how great is the effect on single thread strength of variation in the counts along the single thread. Roughly speaking, it may be said that within the limits of humidity experienced in the Technological Laboratory the effect of this variation of counts is about four times that caused by any likely differences in humidity. For this reason arrangements have been made whereby the counts of the yarn actually broken in the single thread strength tests are determined and allowed for, just as counts of yarn are determined in connection with the tests onlea strength.

Lastly, as foreshadowed in "Technological Reports," ballistic tests are now being carried out on the standard cottons of the 1926-27 series. It remains to be seen how the results of these tests compare with the results of the ordinary lea tests and of the tests for single thread strength and extension.

II. RESEARCH LABORATORY.

Some idea of the rooms of this Laboratory and the equipment thereof is afforded by the various plates which accompany this report and which show:—

Plates 1 and 2 :	Research Laboratory.	Plate
3 :	Director's Office.	
4 :	Fibre Testing Laboratory.	"
5 :	Chemistry Laboratory.	"
6 :	Microscopy Laboratory.	"
7 :	Workshop.	"
8 :	Library and Committee Room.	"

The chief progress on the research side of the work has been in connection with the determination of fibre properties. This of course is in accordance with the general plan that the Research Laboratory should concentrate on that work which is most likely to lead to an understanding of the spinning process in terms of the properties of the raw materials; and as methods are developed the examination of the fibre characters is extended. Details of this plan were briefly described in the Annual Reports for 1923-24 and 1925-26.

Director's Office



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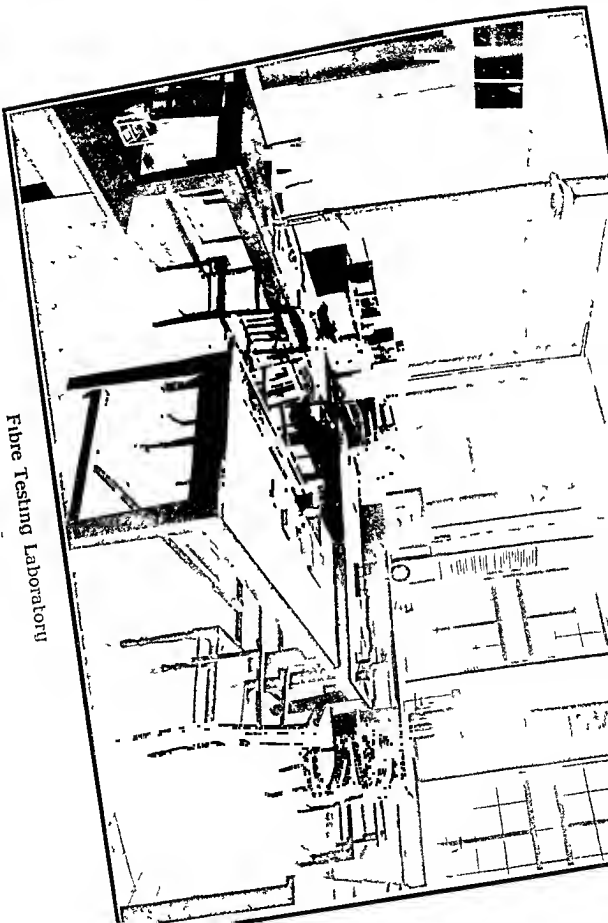
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Director's Office





Fibre Testing Laboratory

Some progress has also been made in the investigation of fibre rigidity, as well as of fibre-convolutions and ribbon-width, and of fibre-width. Convolutions, ribbon-width, and rigidity have been found to be very variable indeed. Unfortunately the staff is not sufficient to cope with the vast number of tests which would be necessary to bring these tests in line with the tests for strength, as they involve much tedious work. Tests are made on two fibres for the preliminary measure, the following routine has been worked out for application to the standard cottons, for their average ribbon width (measured in 10 places per fibre midway between the 10 convolutions), for their rigidity, and total number of their convolutions, for their average ribbon width (measured in 10 places per fibre midway between the 10 convolutions), for their rigidity, and of these properties (except strength) by the following routine: (The "average" measure is measured by another observer.) In this way it is possible to make a comparison of the position and direction of each convolution and of the number of the fibres which he measures) for each standard cotton and all made in the same position. The strength tests on these fibres are tested on this machine, and on the 100 Tester; another 150 fibres are tested on this machine, and on the 100 Tester. The total number of tests for strength on this machine is 100.

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seed of the given variety. This method of determining fibre-weight is checked by another method in which the assumption is made that the fibres, even although they are of different lengths, have the same weight per unit length. In this method a bunch of fibres is carefully cut so as to yield a number of lengths each 1 cm. long, and 10 groups each containing 200 of these 1 cm. lengths are then weighed separately on a micro-balance. From the results the fibre weight per unit length is calculated.

III. GENERAL.

(1) *Staff*.—The staff of the Laboratory on August 31st, 1927, was as follows:—

Director:—A. James Turner, M.A., B.Sc.

RESEARCH LABORATORY.

Physics Section:—

Junior Research Assistants:—N. Hari Rao, M.Sc.; Ram Saran Koshal, M.Sc.

Junior Testing Assistants:—S. S. Sukthankar, L.T.C.; K. G. Deo; H. B. B. Joshi, B.Sc.; K. S. Marar, B.A.; H. R. Nayak; R. G. Panvalkar, B.Sc.

Chemistry Section:—

Senior Research Assistant:—D. L. Sen, M.Sc.Tech., M.Sc., A.I.I.Sc., A.I.C.

Microscopy Section:—

Junior Research Assistants:—H. N. Dutt, B.Sc., M.B.; Amarnath Gulati, M.Sc.

Instrument Maker:—Moreswar M. Patke.

SPINNING LABORATORY.

Spinning Master:—R. P. Richardson, A.T.I.

Electrician:—K. S. Venkataram.

Yarn Testing Section:—

Statistician:—V. Venkataraman, M.A.

Junior Testing Assistants:—G. D. Bhide, B.Sc.; K. V. N. Nayak; V. N. Modak, B.Sc.; L. V. Sundararaman, B.A.; P. S. Sambamurthi; G. J. Kharkar, B.Sc.

Spinning Assistant:—N. Iyengar.

Clerk:—D. C. Mullan.

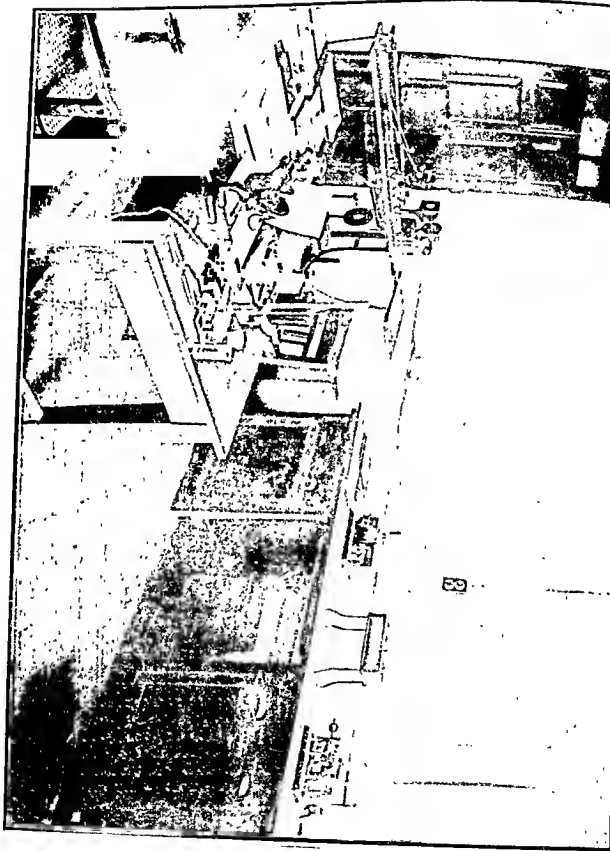
Director's Office:—

Head Clerk:—N. A. Gadre.

Stenographer:—B. P. Jain.

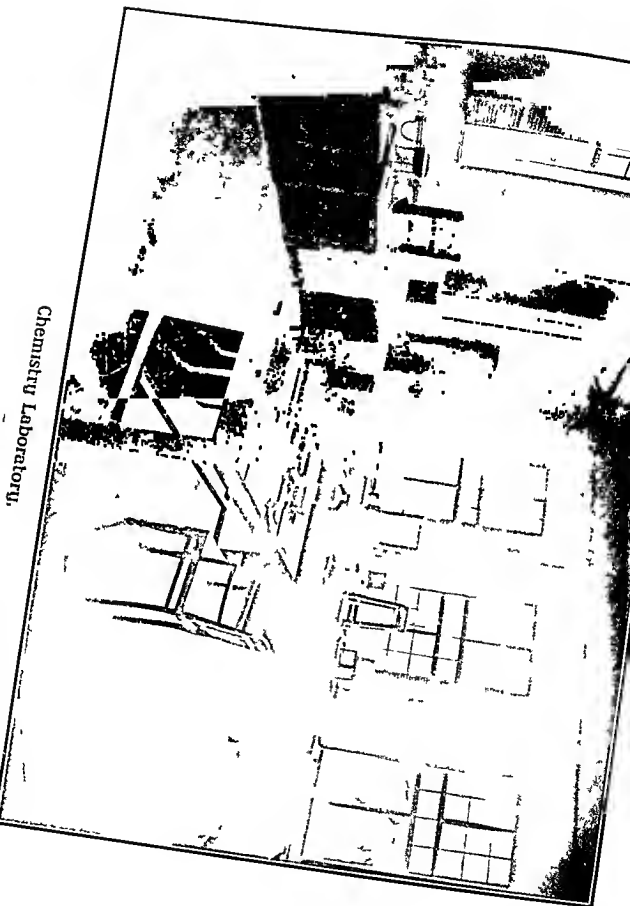
Clerk:—M. T. Sundaram.

Draughtsman:—B. G. Mehta.



Microscopic Laboratory

Chemistry Laboratory.



The creation of a post of Assistant Technologist was sanctioned during the year and Mr D F Kapadia, B Sc Tech (Vict), B Sc (Bom), at present a research student at the Technological Laboratory, will take up the appointment early in the coming year.

A second Junior Microscopist was appointed in July to fill an existing vacancy. The number of Junior Testing Assistants has been increased to 12

During the year the following resigned their appointments —

- 1 Mr M C Bathija—Junior Research Assistant (Physicist)
- 2 Mr J R Desai—Junior Tester
- 3 Mr A Krishnan—Junior Tester

Mr Turner returned from leave on October 28th, 1926, relieving Mr. W G P Wall, Officiating Director.

Mr Richardson went on short leave from June 6th, 1927. Mr A D Waiwyn whose services were kindly placed at the disposal of the Committee by Messrs W H Brady & Co Ltd, officiated as Spinning Master during Mr Richardson's absence.

(2) *Research Students*—Messrs S E Kumana and K Sen have continued their work on the series of special cottons of different botanical species. Mr R S Koshal, having completed his investigation of the rigidity of the special series of cottons, has been studying the correlation between fibre length, ribbon width, fibre strength, and rigidity. He has obtained some interesting results, on which the present routine testing in the Fibre Testing Section is based. Mr Koshal is continuing this work and succeeded Mr Bathija as Junior Physicist on July 1st, 1927.

Mr D F Kapadia has continued to make excellent progress in his special investigation on the variation of yarns, it is on the basis of his results that the new procedure in single thread testing in the Yarn Testing Section has been developed.

Mr R L N Iyengar joined the Laboratory as a Research Student on 1st April, 1927, and is at present taking part in the routine examination in the Fibre Testing Section, where he is learning the methods of fibre testing and acquiring skill therein.

(3) *Buildings and Equipment*—There have been no additions or alterations to the buildings or major equipment during the year. The following items have been added to the equipment —

- 5 Self recording thermo hygrographs of the bi metallic strip and hair type three have been placed in different rooms used for fibre and yarn testing so as to provide complete records of temperature and humidity in these rooms
- 2 Torsion micro balances have been introduced for the determination of fibre weights, and of the counts of the small lengths of yarns used in single thread testing

The apparatus required for the work on the rigidity of the cotton hair and a good deal of minor apparatus has been made in the Laboratory workshop.

(4) *Visitors*.—The Laboratory has continued to prove a source of general interest, and a number of parties and individuals have visited the Laboratory during the year. Among the visitors were the Marquis of Liffingow and a number of members of the Agricultural Commission on Indian Agriculture, on November 2nd, 1926, and the Chairman and members of the Cotton Tariff Board, on December 21st, 1926.

(5) *Publications*.—The following have been published during the year:—

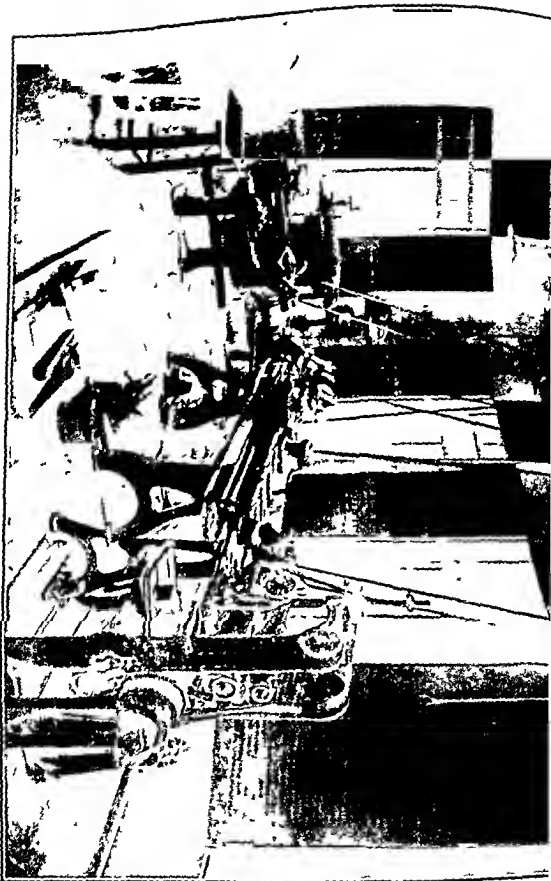
- (i) *Technological Reports on Standard Indian Cottons*, 1923-26. (Bulletin No. 7, Technological Series No. 3, March 1927.)
- (ii) *The Effect of Temperature and Humidity on Cotton Spinning*, with particular reference to conditions in Bombay. (Bulletin No. 9, Technological Series No. 4, August 1927.)
- (iii) *The Effect of Subjecting Cotton to Repeated Blow Room Treatment*. (Bulletin No. 10, Technological Series No. 5, September 1927.)
- (iv) *The Use of Hydrocyanic Acid Gas for the fumigation of American Cotton on Import into India: Experiments on its lethal power for the Mexican Boll-weevil (*Anthonomus grandis*) and for the Grain-weevil (*Sitophilus oryzae*); on the extent to which it is absorbed by Cotton and Jute respectively; and on a practical method for satisfactory fumigation on a large scale.* (Memoir of the Department of Agriculture in India, Vol. X, No. V.)

As in previous years a contribution has been made to the *Bombay Cotton Annual* giving a general discussion of the results obtained during the year.

A. JAMES TURNER,

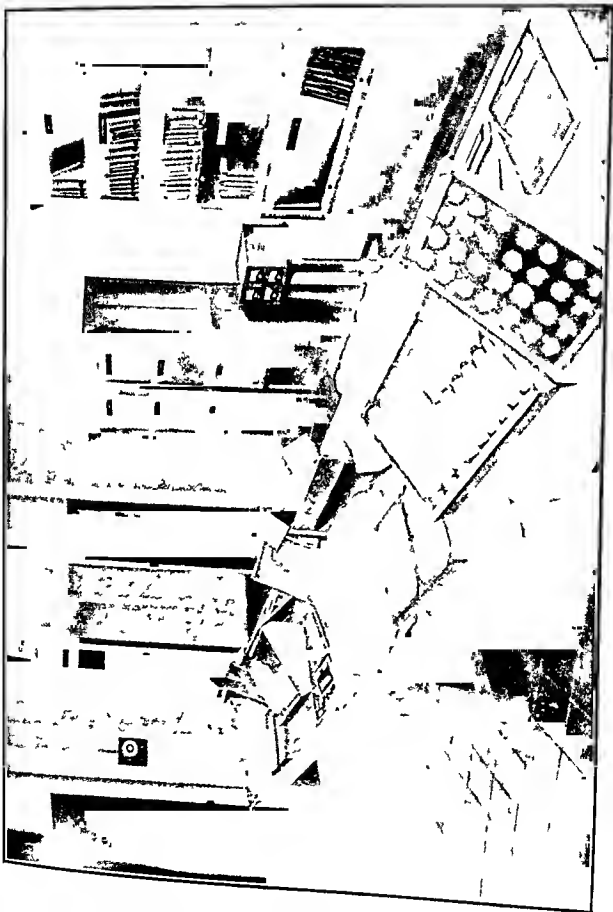
Director, Technological Laboratory.

September, 1927.



Workshop.

Library and Committee Room.



Library and Committee Room.

APPENDIX I.

REVENUE DEPARTMENT.

BOMBAY CASTLE, 10th August 1926.

NOTIFICATION No. 3798/24.—Whereas, owing to the wide extension of the growing of similar high quality of cotton in areas I, II and III of the areas specified in Schedule I to Government Notification in the Revenue Department No. 535-A, dated 18th August 1923, it is no longer necessary to maintain the said areas as separate protected areas for the import of cotton into them by road;

Now, therefore, in exercise of the powers conferred by sub-section (1) of Section 3 of the Cotton Transport Act, 1923 (III of 1923), the Government of Bombay is hereby pleased to cancel the said notification as far as it prohibits the import of cotton by road from the Olpad-Ankleshwar area into the South-Surat area and the Surat area described in Schedule I to the said notification; provided that in the event of the cultivators being found to grow cotton of inferior quality hereafter in any of the said areas, this notification will be cancelled.

By order of the Government of Bombay (Transferred Departments),

G. A. THOMAS,

Chief Secretary to Government.

APPENDIX II.

COTTON IMPROVEMENT ACT—CHHOTA UDEPUR.

WHEREAS it is expedient to improve the quality of cotton grown in this State by prohibiting the import and cultivation of cotton of inferior staple, and to prevent adulteration of good cotton while being ginned or pressed by prohibiting such practices in the mixing of cotton of different staples, it is hereby enacted that—

- (1) This Act shall be termed the Cotton Improvement Act of 1927.
- (2) It shall extend to the whole of the Chhota Udepur State.
- (3) It shall come into operation from the 15th August 1927.
2. In this Act, unless there is anything repugnant in the context or meaning—
 - (a) "bale" means any pressed package of cotton of whatever size or form;
 - (b) "cotton" means every kind of unmanufactured cotton, that is to say, ginned and unginned cotton, cotton waste and cotton seed;
 - (c) "Cotton Ginning Factory" means any place where cotton is ginned or where cotton fibre is separated from seed by any process whatsoever, including the use of steam, water or of electricity;
 - (d) "Cotton Pressing Factory" means any factory in which cotton is pressed into bales;

- (e) "Cotton Waste" means droppings, strippings, fly and other waste products of a cotton mill, or of a cotton ginning factory, or of a cotton pressing factory but does not include yarn waste;
- (f) "License" means a license granted under this Act;
- (g) "Licensee" includes a managing agent or other person authorised under this Act to perform any of the duties of the licensee.

3. No person shall import into the State by road or rail cotton except under a license (Form A) granted by the Darbar.

Provided that a license is not necessary for cotton in transit through the State on the C. U. Railway to a destination outside the State.

4. No person shall knowingly grow in the State cotton other than that prescribed by the Darbar from time to time by Jahirnama.

5. No person shall erect a gin or press without first obtaining the sanction of the Darbar.

- 6. (1) No person shall gin or press cotton in a ginning or pressing factory in the State without first obtaining a license (Form B) from the Darbar.
- (2) Licenses approved shall be granted on payment of such fees as may be determined by the Darbar.
- (3) All such licenses shall be in force for the period from 1st September to 31st August annually and shall bear a number. This number shall be the number of the licensee's ginning or pressing factory and shall be displayed in a conspicuous manner in his factory.
- (4) No license or right therein shall be transferred in any manner without the sanction of the Darbar.
- (5) Every licensee shall furnish to the Darbar the name of his authorised agent, if any, for approval.
- 7. (1) All persons to whom licenses have been granted under the preceding section shall cause to be maintained—
 - (a) a ginning register in Form C.
 - (b) a press register in Form D.
- (2) All ginning registers and press registers shall be maintained for the period 1st September to 31st August annually and shall be produced whenever required for inspection by the Darbar, the Revenue Officer, Thandars or other officials as may be prescribed by the Darbar.
- (3) A copy of the ginning and press registers certified by the licensee, or by his duly appointed agent, shall be forwarded to the Revenue Officer on every Sunday while the factory is working.
- (4) The Revenue Officer shall compile from the weekly returns a Statement in Form E and forward it to the Huzur on the 11th of every month.

8 No cotton shall be ginned or pressed by any licensee which is of a shorter staple than that grown in the State

Provided that a licensee may gin or press cotton of a staple shorter than that grown in the State on his first obtaining the permission of the Darbar and on his satisfying the Darbar that he has made ample provision to prevent the admixture of short staple cotton with long staple cotton either when it is being ginned or when it is being pressed

9 All bales pressed by a licensee shall bear indelibly punched or stamped on one of its hoops the number of the licensee's factory followed by the letter C. U and the last two integers of the year of the license as well as the serial number of the bale as shown on the press register The last integer of the year and the first integer of the serial number of the bale shall be separated by a star

Provided that the serial number of the bale may be stencilled in ink on the hessian covering of a lashed flat side of a bale in such a manner as to be clearly decipherable with a star placed immediately before and immediately after the serial number

Provided that all bales of short staple cotton shall bear in addition to the above marks the letters SS clearly stencilled in ink on the hessian covering of the bale

(2) All letters and numbers shall be in English, those on hoops shall in no case be less than one quarter of an inch in length and those on hessian not less than two inches in length.

10 All weighments of cotton shall be in standard pounds and all weights used shall be in pounds or the following multiples of pounds viz, 24, 7, 14, 28, 56 and 112 pounds

Provided that the entries in registers Form C and Form D be made on—

(a) Form C in maunds of 40 lbs of 40 tolas

(b) Form D in bales of 392 pounds net of cotton, exclusive of packing, or in bales of such other net weight as may be hereafter presented by the Darbar

11 No scale weighing apparatus or weights shall be used in any pressing or pressing factory for the purpose of weighing cotton or pressed bales unless they have been certified and stamped by the Revenue Officer or such other officer as the Darbar may appoint.

(2) All scales weighing apparatus and weights shall be checked for their accuracy by the Revenue Officer or other officer appointed by the Darbar on 1st September and at such other times as may be deemed expedient by the Revenue Officer or other officer appointed by the Darbar

12 No bale shall be removed from a —
the prov
be presc

13 No person shall water any cotton at any time in any place

14. No cotton shall be exported without a custom pass showing that the customs duty thereon has been paid.

(2) No custom export pass shall be issued in respect of baled cotton unless each bale of the consignment is marked according to the provisions of Section 9.

15. Every licensee shall permit the Darbar, Revenue Officer, Thandars or other officials prescribed by the Darbar to enter his gin or press at any time for the purpose of making any examination as may be deemed necessary of the ginning or pressing factory and of any registers.

16. Any person found guilty of a breach of provisions of this Act shall be liable to punishment as set forth hereunder:—

Breach of.

Punishment.

(a) Section 3 or 4 .. Fine not exceeding Rs. 100 and forfeiture of cotton.

(b) Sections 5, 6, 7, 8, 11,
12, 13 or 14 .. Fine not exceeding Rs. 500

Provided that in case of any subsequent breach of a same nature, the accused may be punished with a fine not exceeding twice the amount of the fine above mentioned.

17. Where the person guilty of an offence under this Act is a Company, every Director, Manager, Secretary and other servant thereof who is knowingly a party to the default shall also be guilty of the like offence and liable to the like punishment.

18. No prosecution under this Act shall be instituted without the previous sanction of the Darbar.

(2) All offences under this Act shall be tried by a First Class Magistrate.

(Sd.) J. C. TATE, Major,
Administrator, Chhota Udepur State.

CHHOTA UDEPUR,

Dated 31st July 1927.

FORM C.

Ginning Register for the year commencing 1st September 19 .

Name and number of Factory.....Name and address of owner.....Name and address of owner's Agent.....		Name of persons for whom cotton ginned.	Quantity.		Long or short staple.	Date on which ginned.	Remarks.	Signature of owner or owner's Agent.
			Maunds.	Seers or pounds.				

FORM D.

Press Register for the year commencing 1st September 19 .

Name & No. of Factory.....		Name & address of owner.....		Name & address of owner's Agent. Press Mark C.U.....	
Total number	Serial num.				

APPENDIX III.

FORT ST. GEORGE, *November 18, 1925.*

(G. O. PRESS NO. 1657, DEVELOPMENT).

NOTIFICATION UNDER SECTION 3 OF THE COTTON TRANSPORT
ACT, 1923 (III OF 1923), AS AMENDED BY ACT
No. XXXIV OF 1925.

No. 344.—Whereas it is necessary for the purpose of maintaining the quality and reputation of the cotton grown in the areas in the Madras Presidency mentioned in Schedule I hereto appended.

Now, therefore, in exercise of the powers conferred by sub-section (1) of Section 3 of the Cotton Transport Act, 1923 (III of 1923) as amended by Act No. XXXIV of 1925, the Government of Madras are hereby pleased to prohibit the import of cotton into the said areas by rail and sea save under and in accordance with the conditions of a license prescribed in this behalf subject, however, to the exception specified in clause (3) below.

(2) The Government of Madras are further pleased to prohibit, under sub-section (2) of Section 3 of the said Act, the delivery to, and the taking of delivery by, any person, at any railway station situated in any of the protected areas and specified in Schedule II hereto appended, of any cotton when such cotton has been consigned from a railway station not situated in the said area unless such person holds the prescribed license for the import of cotton into the said area, subject, however, to the exception specified in clause (3) below.

(3) The transport of cotton lint into Tiruppur-Cambodia protected area as defined in Schedule I from the districts of North Arcot, South Arcot, Chittor and Chingleput and from the Atur, Dharmapuri, Hosur, Krishnagiri, Omalur, Salem and Uttangarai taluks of Salem District is exempted from the operation of clauses (1) and (2) and permitted without restriction.

SCHEDULE I.—PROTECTED AREAS.

I. *The Northerns and Westerns area.*—Consisting of the districts of Anantapur, Bellary, Cuddapah and Kurnool.

II. *The Tiruppur-Cambodia area.*—Consisting of the district of Coimbatore, the Karur, Musiri and Kulittalai taluks of Trichinopoly District, the Namakkal, Tiruchengodu and Rasipur taluks of Salem District and that portion of the Madura District lying to the north and west of the Vaigai River.

III. *The Tinnevely area.*—Consisting of the district of Tinnevely and that portion of the districts of Ramnad and Madura lying to the east and south of the Vaigai River.

SCHEDULE II—RAILWAY STATIONS

I. *The Northern and Western area*—All stations from Kottur to Hospet both inclusive, from Rayadurg to Bellary, both inclusive from Hospet to Guntakal both inclusive, from Guntakal to Hindupur, both inclusive, from Guntakal to Tungabhadra River, both inclusive from Dharmavaram to Tanakallu, both inclusive from Guntakal to Cumbum both inclusive on the Guntakal Berwada line, from Dhone to Kurnool both inclusive and from Guntakal to Settikunta both inclusive

II *The Tiruppur-Cambodia area*—All stations from Podanur to Kallar both inclusive Madukarai and all stations from Podanur to Pollachi both inclusive from Podanur to McDonald's Choultry both inclusive from Madura Bridge to Samudram, both inclusive, and from Erode to Marudur both inclusive

III *The Tinnevely area*—All stations from Maniyachi to Madura both inclusive, from Maniyachi to Tankasi both inclusive from Maniyachito Tuticorin both inclusive, from Tinnevely to Tiruchendur both inclusive and from Madura to Mandapam both inclusive

APPENDIX IV.

AREA (IN THOUSANDS OF ACRES) AND YIELD (IN THOUSANDS OF BALES OF 400 LBS.) OF MADRAS COTTONS BY VARIETIES.

1. COIMBATORE AREA.

	Irrigated Cambodia.		Dry Cambodia.		Irrigated Karunganni.		Dry Karunganni.		Uppam.		Nadam, Bourbon.		Tinnevellics.		Total.	
	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.
*Coimbatore District	109	80	33	8	14	5	108	22	23	4	14	1	..	2	301	122
Karur Taluk	10	..	..	..	..	..	..	..	..	..	4	..	..	..	14	..
Palni Taluk	12	..	6	..	..	..	..	..	..	..	..	..	9	..	27	..
Total	131	80	39	8	14	5	108	22	23	4	18	1	9	2	342	122

2. SALEM AREA.

	Small area of Cambodia.		Small area of Cambodia and Uppam		Small area of Cambodia.		Uppam		Nadam, Bourbon.		Tinnevellics.		Total.	
	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.
Chittoor District
Chingleput District
South Arcot District
North Arcot District
Salem District
Trichinopoly District
North of Cauvery
Total	26	16	50	10	..	..	..	..	4	5	..	..	103	30

*Includes 20 acres in Pollachi Taluk rain-fed but equivalent to irrigated.

APPENDIX IV.—(Contd.)

AREA (IN THOUSANDS OF ACRES) AND YIELD (IN THOUSANDS OF BALES OF 400 LBS.) OF MADRAS COTTONS BY VARIETIES.

3. DINDIGUL AREA.

	Irrigated Camlochia.		Dry Camlochia.		Irrigated Karunganni.		Dry Karunganni.		Uppam.		Nadarn Bourbon.		Tinnevelly.		Total.	
	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.
Trichinopoly District—																
South of Cauvery ..	6		23		..		..		..		..		..		29	
Madura District—																
North of Vaigai ..	21	17	50	16	..		..		..		..		8	3	79	36
Ramanad District ..	1		..		..		..		..		..		5		0	
Tanjore District ..	..		..		..		..		2		..		..		2	
Total ..	28	17	73	16	..		..		2		..		13	3	116	36
Salem and Dindigul ..	54	33	123	26	..		..		24	41	5	1	13	3	219	66

4. TINNEVELLY AREA.

	Irrigated Camlochia.		Dry Camlochia.		Irrigated Karunganni.		Dry Karunganni.		Uppam.		Nadarn Bourbon.		Tinnevelly.		Total.	
	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.	Area.	Yield.
Madura District—																
South of Vaigai ..	4		13		..		..		..		..		26		103	
Ramanad District ..	20	19	7	7	..		..		..		..		222	127	249	213
Tinnevelly District ..	8		9		..		..		..		..		375		292	
Total ..	32	19	29	7	..		..		..		..		623	127	744	213

APPENDIX V.

EXTRACT FROM BY-LAWS OF THE EAST INDIA COTTON ASSOCIATION.

BY-LAW 53—*Stations tenderable*.—Against the Hedge Contracts shown in column (1) of Schedule B, the contracts shown in the corresponding column (2) and the cotton pressed only at the places enumerated in the corresponding column (3) subject to such modifications as the Board may from time to time make thereon against each contract, shall alone constitute a fair tender provided that:—

- (1) It is of the description sold and provided that if pressed after 1st September 1926 it bears press marks in conformity with the provisions of the Cotton Ginning and Pressing Factories Act, 1925, or with the law in force for the marking of bales in any Indian State.

BY-LAW 66—*Stations tenderable*.—Against delivery contracts, only cotton pressed at the place or places mentioned in the Contract shall constitute a fair tender, provided it is of the description sold. Where a district is mentioned in such contract only cotton pressed at one or more of the stations enumerated in column 3 of Schedule B (as modified by the Board from time to time) shall constitute a fair tender provided it is of the description sold and provided that if pressed after the 1st September 1926 it bears press marks in conformity with the provisions of the Cotton Ginning and Pressing Factories Act, 1925, or with the law in force for the marking of bales in any Indian State.

BY-LAW 61—*Rejections of Tenders*.—(1) Cotton will be considered "not a fair tender" if it is declared not of the description sold, or if it does not conform to By-law 53, in which case the cotton shall be rejected. The buyer shall be entitled to invoice it back at the spot rate of the day following that on which the final award is given under By-law 35 or 37 or, in cases of arbitrations other than those regarding quality under By-law 38, at such rate as may be fixed by the arbitrators or umpire, and, in case of appeal, by the Board.

Such a tender shall also be liable to such penalty not exceeding Rs. 50 per candy as may be fixed and imposed by the Board. When the penalty sought to be fixed under this clause is more than Rs. 25 per candy, such increased penalty as may be thought fit will only be levied in case 75 per cent. of the Directors voting at the meeting are in favour of it.

If the cotton be found to be fraudulently packed it shall be similarly penalised.

 APPENDIX VI.

AMENDMENTS PROPOSED TO THE BOMBAY COTTON GINNING AND PRESSING FACTORIES RULES, 1925.

Delete the present Rules 6 (2), 7 and 8 and substitute 6.....

(2) On and after the first day of September 1928 no weights shall be used in any cotton ginning or cotton pressing factory unless duly certified in accordance with these rules.

(3) On and after the same date any weight not so certified which is found in the possession of the owner of any cotton ginning or cotton pressing factory shall be deemed to have been used in such factory

6A The Inspector shall only certify a weight which—

(a) does not deviate from the standard weights supplied to him in excess of the following limits —

Denomination of weight	Maximum deviation permissible
1 lb	$\frac{1}{2}$ tola
2 lbs	
4 lbs	
7 lbs	
14 lbs	1 tola
28 lbs	
56 lbs	2 tolas
112 lbs	4 tolas

(b) does not in his opinion facilitate the perpetration of fraud ,

Example—A weight which has a removable or split ring shall be deemed to facilitate the perpetration of fraud

(c) has the denomination of the weight clearly and indelibly marked on it,

(d) is free from flaws and smooth on all its surfaces,

(e) is provided with one adjusting hole in its under surface The adjusting hole shall not extend to the upper surface of the weight and shall be undercut so that the lead adjustment is not removable

Exception—Any weight offered for certification at the first inspection of n factory by the Inspector under these rules may have two adjusting holes

6B A weight shall be deemed duly certified when it has been stamped on the lead adjustment by the Inspector in such a way as to cover the lead as far as possible with a monographic stamp on which the letters B O M have been incorporated

6C If on any subsequent test the Inspector shall find that any weight does not fulfil the conditions of Rule 6A above he shall obliterate all the impressions on the lead adjustment of the weight and the weight shall be deemed not to be duly certified

7 (1) On and after the first day of September 1928, no scales or weighing apparatus shall be used in any cotton ginning or cotton pressing factory for the purpose of weighing kapas ginned cotton pressed bales or any other cotton unless they have been duly certified by the Inspector

(2) On and after the same date if any scales or weighing apparatus not duly certified, are found in the possession of the owner of any cotton ginning or cotton pressing factory, the burden of proof that the scales or weighing apparatus have not been used for the said purpose shall be upon the said owner

APPENDIX VII.

THE DAMAGE CAUSED TO COTTON BY WATERING

SOME years ago it was a common complaint that Indian cotton was watered during pressing and that this practice caused great deterioration in the cotton. Since then such complaints have been less common but unfortunately this year there has been a recrudescence of the practice. The Central Cotton Committee desire to bring to the knowledge of the public the harm that this practice causes and to show how eventually it leads to loss to the grower.

The objections to watering are the following:—

- (1) Watered cotton deteriorates in appearance, the leaf turns black and the cotton becomes discoloured—this leads to a reduction in price. Eventually the cotton of the district gets a bad name resulting in permanent undervaluation to the detriment of the grower.
- (2) Cotton which has been pressed damp forms hard lumps which are difficult to deal with in the mill; hence spinners pay lower prices for such cotton.
- (3) Watered cotton deteriorates greatly on storage. Dry cotton in bales can be kept for months without any harm; damp cotton gradually deteriorates on keeping and the cotton becomes weak and less valuable to the spinner. The damage is caused by micro-organisms which penetrate the fibre and destroy its strength—these tiny organisms can only grow in the presence of moisture.
- (4) Actual spinning tests have shown that cotton which has been watered during pressing produces weaker yarn than dry cotton.

This being the case the question arises why cotton merchants and press-owners water their cotton. The only answer is that it is an attempt to increase the weight of the cotton. This in itself would be a foolish practice, even if no other harm resulted, for the mill buyer will soon realize what is happening and refuse to pay for water at cotton prices. But the result is worse than this. Berar cotton for example can be watered to the extent of, say, 10 lbs. per bale which represents a gain to the seller of, say, six rupees per candy. The damage done is far greater. At the present moment there are in Bombay hundreds of bales of watered cotton (from the Central Provinces and Berar) which are only saleable at poor rates even in a 'firm' market. Had the market been 'easy' it is doubtful if such cottons would have been saleable at all. For good dry Berar cotton Rs. 11 per candy above the Fine Oomras contract price is being paid at the present time while watered cotton can only be sold at Rs. 5 to Rs. 7 below Oomras. This is a difference of Rs. 18 per candy against the Rs. 6 which the up-country merchant gained by watering.

Other Bombay merchants have found that cotton, not badly watered, which they hoped to sell at Rs. 5 above Oomras is now selling at Rs 5 off Dry Khandesh cotton which is not even of the first quality is selling at Rs. 7 above the Oomras contract price though ordinarily Khandesh fetches lower price than Berar. These instances show the loss which is caused by watering cotton. In addition it should be pointed out that the East India Cotton Association have penalised watered cotton when such has been tendered against hedge contracts, in some cases 'off' allowances have been fixed, in others the cotton has been rejected entirely.

The up country merchant or press-owner has done the watering on the assumption that he will have sold his cotton and got his money before the damage is apparent. This was true just at the beginning of the season but it did not continue. So soon as the watering at places like Shegaon was discovered, buyers realizing the risk of deterioration and loss on unsold stocks, became shy and the price for Oomras cottons did not rise to the figure which the excellent crop of the season would have justified. The result was lower quotations for Oomras and lower prices for *Kapas* in the up country markets. Once the cotton of a tract gets a bad reputation the effect on prices is prompt but the recovery is slow—and the grower suffers. A considerable amount of cotton is sold in Bombay by commission agents and the up country owners of watered cotton are probably now realizing that malpractices of this type do not pay.

Watering has been most prevalent in the past when the crop has been unusually free from weather damage and black leaf. In other words, by deliberate adulteration the quality of the best cotton in favourable seasons has been reduced. The excuse is sometimes advanced that it is necessary to wet cotton in order to press it this is not in accordance with facts. If an ordinary press is kept in even reasonably good order there is no difficulty in pressing dry cotton to the required weight per bale. As has been shown above the sole object of watering cotton is to secure an unfair gain in weight, which is often temporary and in doing so permanent damage is done to the cotton, a result which is detrimental alike to the grower, trader and spinner. The Central Cotton Committee desire to bring these facts to general notice in order to prevent further harm being done to the grower by shortsighted practices of this nature.

Bombay, July 7th, 1927.

APPENDIX VIII.

IMPROVEMENT OF PRIMARY COTTON MARKETING.

THE Indian Central Cotton Committee has devoted considerable attention to the improvement both of cotton production and cotton marketing and have approached the latter subject from two aspects. They have promoted legislation,

to which the Act has been applied, the second Act which is a more...

promises to be equally useful. Further, the Committee have secured the co-operation of the cotton trade in obtaining certain improvements in large-scale marketing. For example 'on allowances,' up to two full grades, may now be claimed when cotton of superior "class" is tendered against a hedge contract and the cottons from certain areas, such as Rajpipla and Ankleshwar where improved types of superior staple are now grown, have been made tenderable against higher standards leading again to 'on allowances.' All such measures lead to better cotton for the consumer and higher prices to the grower but more is needed. It may be taken as axiomatic that improvements in cotton production depend on a better return to the grower and hence an improvement of the conditions under which the grower markets his produce is a primary necessity.

The Indian Central Cotton Committee have recently conducted some investigations into the finance of the cotton grower in certain areas and the results, especially from Khandesh and Berar, have been very striking. The opinion has been widely held in the past that the cotton grower is so involved financially that he is unable to take advantage of market facilities. Whatever may have been the case in the past, the investigations in Khandesh and Berar have shown that this is not the case at present. In 1926, growers in these areas not only were not compelled to rush their *kapas* to market but actually held a considerable portion of their crop unsold until several months after picking. Further, it was found that only in comparatively rare instances were cultivators selling *kapas* to or through the persons from whom they had borrowed money. One general conclusion reached was that while cotton growers require considerable sums for the financing of their agricultural operations, mortgaging and advance sales of the standing crop are now practically unknown in the areas investigated and that what the cotton grower most needs at present is improved market facilities. It is obviously an advantage, both to the grower and the cotton trade, that the cultivator should gain that touch with substantial buyers which sale in an open market, where there is real competition, encourages.

It may be stated that the method of enquiry was to obtain records from every cotton grower in a number of villages which were selected as typical of the tract. In the Khandesh enquiry, records from 813 growers and in the Berar enquiry records from 940 growers were obtained and details as to how each man marketed his cotton and of what prices he obtained were recorded. The local markets were also visited and actual details of 2,908 transactions in Berar and 900 transactions in Khandesh were recorded.

The two tracts, Khandesh and Berar, are similar in many respects, the outstanding difference being that for many years Berar has possessed open cotton markets controlled by Market Committees and governed by rules framed under the Berar Cotton Markets Law. In Khandesh no such regulated markets exist, though there are several unregulated markets such as Dhulia, Amalner, Dondaichi, Sherpur, Nandurbar and Pachora which are used by cotton growers to an appreciable extent.

As far back as 1918 the Indian Cotton Committee strongly recommended the adoption of the Berar system of cotton markets in other parts of India, but doubts

have since been expressed as to whether cultivators themselves use such markets to any appreciable extent. These doubts have been removed by the investigations described above. The village enquiry in Berar showed that 53 per cent of the cotton growers (in one district 74 per cent) had taken their *kapas* to the regulated markets and that of the total *kapas* produced (only 87 per cent of which had been sold at the end of the enquiry) 59 per cent (or 68 per cent of the total *kapas* sold) had been sold in this manner. In Khandesh, as one would expect, the lack of regulated markets caused a larger number of village sales, nevertheless 30 per cent of the cotton growers in the West Khandesh villages took their *kapas* to the larger markets, the percentage in East Khandesh was 85 only.

The opinions of individual cultivators in regard to the disposal of their produce were recorded and there was a general unanimity of opinion that better rates and better weightments are obtained in the larger markets. But many Khandesh cotton growers described certain practices prevalent in the larger markets which discourage cultivators from using them. The principal complaint was that the rate paid was not the rate settled in the market but that, after weightment had commenced, disputes arose and eventually the cultivator was obliged to accept a lower rate than that originally bargained for. In a few instances rather than submit to such deductions, the cultivators took their *kapas* away but generally this course was impossible. It is, of course, recognized that allowances for quality are necessary and that only really good *kapas* will secure the full rate of the day. But it was definitely established by actual figures obtained from one of the Khandesh markets that double deductions were the practice. The market rate of the day, the actual rate for particular cart loads settled in the market and the rates finally settled in the ginning factory (after or during weightment) were recorded and it was clearly shown that the *kapas* was allowed twice. Further proof if any were needed that unfair deductions were being made was afforded by the fact that on succeeding days the market brokers combined to prevent the investigators recording the rates settled in the market. A second cause of complaint was that unauthorised deductions of various kinds were made from the weight of *kapas*, it was found that such deductions were a common practice. Complaints of unrecognized allowances, in addition to the recognized market charges were numerous. Another objection urged was that the rates in the markets are not settled by open bid but by secret signs and that the rates of the day are not properly posted. It was further complained that in those markets where brokers have to be employed such brokers or *arhatyas* though paid a commission by the seller, in actual practice do not watch the seller's interest but act entirely for the buyer.

In contrast to conditions in Khandesh it will be observed that in Berar a much larger percentage of growers habitually take their *kapas* to the regulated markets. It was further ascertained that current prices were far better known in Berar villages than in Khandesh and the discrepancy between market and village prices smaller thus showing that even those growers who sell their *kapas* to peripatetic dealers or local shop keepers benefit by the existence of properly regulated markets. Though the Berar markets are still capable of improvement there is little doubt that they are the best in India at present and that the growers benefit considerably from them.

The Government of Bombay have recently announced the introduction of the Bombay (District) Cotton Markets Bill which will shortly be before the local legislature. The object of this Bill is to enable open cotton markets, somewhat on the lines of the Berar markets but with certain improvements, to be established in places where there is a demand for such facilities. The proposed Act is purely of an enabling nature and contains provisions for ascertaining local opinion before markets are notified. It is proposed that the notified markets will be controlled by Market Committees on which cotton growers will be adequately represented, as this appears to be the only means by which the sellers' interests can be properly safeguarded.

Many of the provisions of the Bill are of a formal nature since the Market Committee will need authority to incur expenditure on the provision of a convenient market yard and for the employment of such staff as may be necessary for the proper control of the market. The main principles of the Bill are the following:—

Firstly, market fees will be applied to the maintenance and improvement of the market and for the benefit of the users of the market. Secondly, rules under the Act (which it will be observed must be laid before the Legislative Council) will make provision for the proper control of brokers and weighmen and for recognized scales of trade allowances; it is understood to be the intention that such rules will follow broadly the rules at present in force in Berar with such modifications as experience indicates to be desirable or as may be necessary to meet local conditions. Thirdly, the Market Committee will be authorised to make by-laws for the regulation of business and the conditions of trading in the markets which they control, thus providing the necessary elasticity and adaptability to local needs.

THE PROVISIONS OF THE BILL.

The draft Bill will be found in the Appendix; reference may be made here to the reason for some of the clauses.

Clause 2.—The City of Bombay is specifically excluded because cotton transactions in Bombay are governed by the Bombay Cotton Contracts Act (XIV of 1922) which applies to the City of Bombay only. The proposed Act being of an enabling and permissive character applies to the whole of the Bombay Presidency (including Sind) but it does not follow that it will be applied throughout the Presidency at once—as will be clear from clause 4. It should be added that it is not the intention that this Act should be used to regulate wholesale trading in baled cotton in such towns as, for example, Karachi and Ahmedabad.

Clause 3.—(i) As has been explained, the object of the Bill is to promote the improvement of primary cotton markets, where the grower sells his cotton. It is necessary, however, to include ginned cotton in the definition as a limited number of growers in all areas, and an appreciable number in some, actually sell ginned cotton. Cotton waste is included in order that the Market Committee may have power to prevent it being sold in such a manner as to encourage adulteration.

(iii) The Divisional Cotton Committee is defined with reference to clause 4. Divisional Cotton Committees appointed by the Local Government have been in existence since 1922 in the following divisions:—

Gujerat, Khandesh, the Southern Division, Sind.

The present constitution of these four Divisional Cotton Committees is as follows —

Cultivators representatives	4
Representatives of the Cotton Trade	2
Representative of the Agricultural Department	1
Representative of the Co operative Department	1
	<hr/>
	8
	<hr/>

It will be noted that these Divisional Committees will be formally constituted by rule under the Act and the opportunity undoubtedly will be taken of examining the suitability of their constitution

Clause 4 (1) —An essential feature of the Act is that local opinion has to be consulted before any cotton markets are notified. The conditions of cotton marketing in the Bombay Presidency are diverse and before a market is notified in any area it will be ascertained by full local enquiry that one is needed and that it is likely to work successfully

Clause 5 —This clause differs from the corresponding section of the *Pearl Cotton and Grain Markets Law* in that it provides for representation of cotton growers on the Market Committee. All members of the Market Committee except two are to be elected by the buyers and sellers, one member will be elected by the local authority (municipality, local district board or other local body) within whose jurisdiction the market is situated and one will be nominated by the Local Government. The representation proposed for growers is slightly greater than that proposed for traders as the latter are in regular attendance at the market while all growers will not be able to attend at the same time.

Clause 6 —The important sub sections of this clause are (viii), (ix), (ix) and (x). By rules framed under these sub sections the Market Committee will have powers to ensure that trading is carried on under conditions which will be fair to buyer and seller alike.

Clause 7 allows the Market Committee to frame any new bye-laws by which these require the sanction of the Commissioner in order that they may not be inconsistent with the rules made by Government.

Clause 9 —Subject to the rules made by Government the Committees to employ such persons as may be necessary for the management of the market. In markets of any size a market superintendent will be needed and in some markets it may be desirable for a market committee to be appointed. Market Committee and not as at present the market superintendent. The provision of unbiased weighmen is an important matter and the number of weighmen needed must necessarily vary in different markets.

Clause 13 —This is an important clause. It provides that no allowance whether in weight or in price, shall be permitted by the law will be permitted.

Clause 16.—This clause is obviously necessary as otherwise a combination of buyers or brokers might set up a rival unregulated market adjoining the notified market and so defeat the intention of the Act. The radius to be served by each market will be fixed, after local opinion has been consulted, in the notification constituting the market. The clause is not intended to give regulated markets any unreasonable monopoly or to force sellers to use them but is a necessary emergency power. There will be no compulsion to deal in the market and the purchase and sale of *kapas* in the villages will in no way be interfered with. The sole intention of the Bill is to give the grower a place where, if he wishes, he *can* sell his cotton under recognised rules.

Bombay, June 21st, 1927.

APPENDIX.

Bill published in "Bombay Government Gazette" dated January 24th, 1927, Part V, p. 4, under Rule 18 of the Bombay Legislative Council Rules.

BILL NO. III OF 1927.

THE BOMBAY COTTON MARKETS BILL.

A Bill to provide for the establishment and the better regulation of Cotton Markets in the Bombay Presidency.

Whereas it is expedient to provide for the establishment of recognized open markets for the purchase and sale of cotton in the Bombay Presidency, excluding the City of Bombay and Aden, and for the better regulation of such markets; And Whereas the previous sanction of the Governor-General required by Section 80-A of the Government of India Act and the previous sanction of the Governor required by Section 80-C of the said Act have been obtained for the passing of this Act: It is hereby enacted as follows:—

Short title. 1. This Act may be called the Bombay Cotton Markets Act, 192 .

Extent. 2. This Act shall apply to the whole of the Presidency of Bombay except the City of Bombay and Aden.

Definitions. 3. In this Act, unless there is anything repugnant in the subject or context:—

'Cotton.' (i) "Cotton" includes ginned cotton, unginned cotton, cotton waste.

'Cotton Market.' (ii) "Cotton market" means a market established under Section 4.

(iii) "A Divisional Cotton Committee" shall consist of the members elected by such body or bodies and in such manner as may be prescribed in this behalf, together with such persons as may be nominated by Government to represent the interests of growers of, and dealers in, cotton

Prescribed (iv) "Prescribed" means prescribed by rules or by-laws made under this Act

4 (1) The Local Government may, after consulting the Divisional Cotton Committee or upon a representation made by them by notification of a cotton market, declare that any place shall be a cotton market established under this Act

(2) Every such notification shall define the limits of the cotton market so established, and may for the purposes of this Act include within such limits such local area as the Local Government may prescribe

5 For every cotton market there shall be a market committee The market committee shall be constituted as prescribed and shall consist of not less than twelve and not more than sixteen members. Of these not less than half shall be persons elected by the cotton growers of such area as the Local Government may prescribe one shall be a member nominated by the Local Government, one shall be elected by the local authority of the area in which the cotton market is situated and the remainder shall be elected by the traders in the cotton market in such manner as may be prescribed

6 (1) The Local Government may, either generally or specially for any cotton market or group of such cotton markets, make rules consistent with this Act for the purpose of the management and regulation of such cotton markets under this Act

(2) In particular and without prejudice to the generality of the foregoing power, such rules may provide for or regulate—

(i) the election and nomination of members of the market committee, the number of members to be elected by each of the bodies referred to in Section 5, and the manner of election and the term of office of such members;

(ii) the powers to be exercised by the cotton market committee,

(iii) the election of the chairman of such committee and his term of office.

(iv) the filling of casual vacancies in the offices of members or in the office of chairman of the market committee.

(v) the constitution of the Divisional Cotton Committee,

(vi) the management of the cotton market and the prescribing of fees by the market committee and, subject to the provisions of this Act, the collection and disposal of such fees.

(vii) the issue by the market committee of licenses to brokers, weighmen, measurers, surveyors and warehousemen and other persons using the cotton market, the form in which, and the conditions under which, such licenses shall be issued, and the fees to be charged for such licenses,

- (viii) the place or places at which cotton shall be weighed or measured, and the kind and description of the scales, weights, and measures to be used at such place or places ;
- (ix) the periodical inspection, verification and correction of all scales, weights and measures in use in the cotton market ;
- (x) the trade allowances which may be made or received by any person in any transaction in a cotton market ;
- (xi) the preparation of plans and estimates for works proposed to be constructed partly or wholly at the expense of the market committee, and the grant of sanction to such plans and estimates ;
- (xii) the form in which the accounts of the market committee shall be kept, the manner in which they shall be audited, and the time or times at which they shall be published ;
- (xiii) the preparation of an annual budget and its submission for sanction, and the reports and returns which shall be furnished by the market committee ;
- (xiv) the disposal of any surplus funds of the market committee ;
- (xv) generally for the guidance of the market committee.

(3) Any such rules may, when necessary, provide that any contravention thereof or of any of the conditions of any license issued thereunder shall be punishable with fine which may extend to five hundred rupees.

(4) All rules made under this section shall be subject to previous publication and shall, when made, be laid on the table of the Bombay Legislative Council.

7. Subject to any rules made by the Local Government under the last preceding section and with the previous sanction of the Commissioner, the market committee may, in respect of the cotton market under its management, make by-laws for the regulation of the business and the conditions of trading in such market and may provide that contravention thereof shall be punishable with fine which may extend to fifty rupees.

8. The market committee may appoint one or more of its members to be a sub-committee or to be a joint committee for the conduct of any work or works or to report on any matter or matters, and may delegate to any one or more of its members such of its own powers as may be necessary.

9. (1) The market committee may employ such officers and servants as may be necessary for the management of the cotton market and may pay such officers and servants such salaries as the committee thinks fit. The committee may, in the case of any officer or servant of Government which it employs, pay such pension, contribution, gratuity or leave allowance as may be required by the regulations made by Government in this behalf and for the time being in force.

(2) The committee may also, in the case of any of its officers and servants, provide for the payment to them of such leave allowances, pensions or gratuities as it deems proper, and may contribute to any provident fund which may be established for the benefit of such officers and servants.

(3) The powers conferred by this section on the market committee shall be exercised subject to any rules which may be made in this behalf by the Local Government.

10 (1) Every contract entered into by the market committee shall be in writing and shall be signed on behalf of the market committee by the chairman and two other members of the market committee.

(2) No contract other than a contract executed as provided in sub section (1) shall be binding on a market committee.

11 All monies received by a market committee shall be paid into a fund to be called the 'Market Committee Fund' and all expenditure made by the market committee under or for the purposes of this Act shall be defrayed out of the said fund any surplus remaining after such expenditure has been met shall be expended as may be prescribed in the rules made in this behalf.

12 Subject to the provisions of Section 11 all fees collected by the market committee under this Act or the rules made thereunder shall be expended on —

- (i) the maintenance and improvement of the cotton market,
- (ii) the construction and repair of buildings which are necessary for the purposes of such market and for the health convenience and safety of the persons using it and
- (iii) the pay, pensions, leave allowances and pensions or provident fund contributions of the officers and servants employed by the market committee

13 (1) No trade allowance other than an allowance prescribed by rules or by laws made under this Act, shall be made or received by any person in any transaction in a cotton market established under this Act, and no Civil Court shall in any suit or proceeding arising out of any transaction in any such cotton market, have regard to any trade allowance not so prescribed.

Explanation — Every deduction other than deductions on account of deviation from sample, when the purchase is made by sample, or of deviation from standard, when the purchase is made by reference to a known standard, or on account of difference between the actual weight of the packing and the standard weight, or on account of the admixture of foreign matter shall be regarded as a trade allowance for the purposes of this Act.

14. (1) Every market committee may, with the previous sanction of the Local Government, raise the money required for carrying out the purposes of this Act on the security of any property vested in and belonging to the market committee, and of any fees leviable by the market committee under this Act.

(2) The conditions under which such money shall be raised and the time within which the same shall be repayable shall be subject to the previous sanction of the Local Government.

15. (1) If in the opinion of the Local Government a market committee is not competent to perform, or persistently makes default in the performance of, the duties imposed on it by or under this Act, or exceeds or abuses its powers, the Local Government may, by an order published in the *Bombay Government Gazette*, declare such market committee to be incompetent, or in default, or to have exceeded or abused its powers as the case may be, and may supersede it.

(2) When a market committee has been superseded, all members of the committee shall, as from the date of the order, vacate their offices as members.

(3) When a market committee has been superseded, all property and rights vested in it shall, subject to all charges and liabilities affecting the same, vest in Government.

Provided that if no new market committee is constituted for the cotton market under Section 5, all property that shall remain after the satisfaction of all the debts and liabilities of the superseded market committee shall vest in the local authority of the area in which the cotton market is situated for the purpose of any object of public utility in the said area.

16. Wherever the Local Government has, by a notification under Section 4, declared any place to be a cotton market, no person shall, within the area of such cotton market or within a distance thereof to be notified in the *Bombay Government Gazette* in this behalf in each case by the Local Government, except with the sanction in writing of the Local Government expressed over the signature of a Secretary to Government and subject to such conditions as may be imposed in such sanction, set up, establish or continue or allow to be continued any market for the purpose of the purchase and sale of cotton.

17. Whoever in contravention of this Act, sets up, establishes, continues or allows to be continued any market for the purpose of the purchase and sale of cotton, or violates the conditions under which he has been allowed to set up, establish or continue, any such market, shall be punished with fine which may extend to Rs. 500, and, in case of a continuing breach of the provisions of Section 16, with fine which may extend to Rs. 100 for each day after the first during which the breach continues.

18. No offence under this Act or under any rule made under Section 6 shall be triable by a magistrate other than a magistrate of the First Class.

All fines and damages recovered from an offender shall be paid to the market committee.

Prosecutions under this Act may be instituted by any person duly authorised in writing by the market committee in this behalf.

STATEMENT OF OBJECTS AND REASONS.

The Indian Cotton Committee of 1917-18 drew attention to the necessity of better provision for the marketing of cotton and kapas by pointing out the advantages of the Berar system of cotton markets in leading to higher prices, fairer weightings and the prevention of local monopolies. It urged the establishment of open cotton markets of this nature which would benefit the growers and indirectly the cotton trade generally. The experience of the Co-operative Cotton Sale Societies has also shown the great value of an organisation for the sale of graded kapas.

2 The present Bill, which is purely an enabling measure, is based on the recommendations of the Indian Cotton Committee and on the provisions of the Grain Markets Law, 1897. Cotton markets are now established in certain parts of the Bombay Presidency, but no legal restriction exists as to the number of such markets other than the market in the city of Bombay. It is proposed that the whole of the Presidency of Bombay, except the city of Bombay, be divided into cotton markets. By clause 4 power is taken to notify any place as a cotton market, and to define the limits of such market. Provision is made for the market committee, to be being consulted, before a cotton market is established. In each notified place, if a cotton market a market committee is to be constituted, consisting of representatives of the cotton growers, of the cotton trade and of the public. The jurisdiction of the market committee is to be determined by the position of the market, the nature of the market and the position of the market committee. The market committee is to be empowered to make by-laws to regulate the trade in cotton and to make rules. Under clause 16 no private market for the sale of cotton shall be opened in or near places declared to be cotton markets. Clause 17 provides for made for allowing trade allowances to be made by the market committee and for penalties for violation of the provisions of the Act. Clause 15 states that the market committee may make rules and regulations for the consequences of its enforcement.

15th Jan 1927, 1927

(Sd) *[Signature]*

[Signature]

[Signature]

Boxer, 21st January, 1927

APPENDIX IX.

BOMBAY COTTON MARKETS BILL.

BILL No. III OF 1927.

A BILL TO PROVIDE FOR THE ESTABLISHMENT AND THE BETTER REGULATION OF COTTON MARKETS IN THE BOMBAY PRESIDENCY.

(As passed by the Bombay Legislative Council on the 1st of October 1927.)

WHEREAS it is expedient to provide for the establishment of recognized open markets for the purchase and sale of cotton in the Bombay Presidency, excluding the City of Bombay, Aden and the town of Karachi, and for the better regulation of such markets; And Whereas the previous sanction of the Governor-General required by Section 80-A of the Government of India Act and the previous sanction of the Governor required by Section 80-C of the said Act have been obtained for the passing of this Act; It is hereby enacted as follows:—

Short title.

1. This Act may be called the Bombay Cotton Markets Act, 1927.

Extent.

2. This Act shall apply to the whole of the Presidency of Bombay except the City of Bombay, Aden and the town of Karachi comprising, as from time to time constituted, the municipal district of Karachi, the Port of Karachi and the Cantonments of Karachi and Manora.

Definitions.

3. In this Act, unless there is anything repugnant in the subject or context:—

(i) 'Cotton.'—"Cotton" includes ginned cotton and unginned cotton.

(ii) 'Cotton market.'—"Cotton market" means a market established under Section 4.

*(iii) 'Grower of cotton.'—"A grower of cotton" shall not include a dealer or broker in cotton, although such a person may grow cotton. If a question arises whether any person is a grower of cotton or not for the purpose of this Act, the decision of the Collector of the district in which the person permanently resides shall be final.

(iv) 'Prescribed.'—"Prescribed" means prescribed by rules or by-laws made under this Act.

4. *(1) The local Government may, after consulting the District Local Board and such other local authorities as they deem necessary or upon a representation made by the District Local Board, by notification in the *Bombay Government Gazette*, declare that any place shall be a cotton market established under this Act.

(2) Every such notification shall define the limits of the cotton market so established, and may, for the purposes of this Act, include within such limits such local area as the local Government may prescribe.

*Clause as amended at the second reading; the amendments have been taken from the Official Report of Bombay Legislative Council Debates,

*5 For every cotton market there shall be a market committee. The market committee shall be constituted as prescribed and shall consist of not less than twelve and not more than sixteen members.

Of these not less than half shall be persons elected by the growers of cotton of such area as the local Government may prescribe, one shall be a member nominated by the local Government, one shall be elected by the District Local Board of the district in which the cotton market is situated, one by the municipality, if any, of the area in which the market is situated, and the remainder shall be elected by the traders in the cotton market in such manner as may be prescribed.

6 (1) The local Government may, either generally, or specially for any cotton market or group of such cotton markets, make rules consistent with this Act for the purpose of the management and regulation of such cotton markets under this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for or regulate —

- (i) the election and nomination of members of the market committee, the number of members to be elected by each of the bodies or groups of individuals referred to in Section 5 and the manner of election the preparation and revision of lists of voters from time to time, the payment of all expenditure in connection with or incidental to such election and the term of office of such members,
- (ii) the powers to be exercised by the cotton market committee,
- (iii) the election of the chairman of such committee and his term of office,
- (iv) the filling of casual vacancies in the offices of members or in the office of chairman of the market committee,
- (v) the management of the cotton market and the prescribing of fees by the market committee, and subject to the provisions of this Act, the collection and disposal of such fees,
- (vi) the issue by the market committee of licenses to brokers weighmen measurers, surveyors and warehousemen and other persons using the cotton market, the form in which and the conditions under which such licenses shall be issued, and the fees to be charged for such licenses,
- (vii) the place or places at which cotton shall be weighed or measured and the kind and description of the scales, weights and measures to be used at such place or places,
- (viii) the periodical inspection, verification and correction of all scales, weights and measures in use in the cotton market,
- ix) the trade allowances which may be made or received by any person in any transaction in a cotton market,

* Clause as amended at the second reading the amendments have been taken from the Official Report of Bombay Legislative Council Debates,

- (*) the preparation of plans and estimates for works proposed to be constructed partly or wholly at the expense of the market committee, and the grant of sanction to such plans and estimates ;
- (vi) the form in which the accounts of the market committee shall be kept, the manner in which they shall be audited, and the time or times at which they shall be published ;
- (vii) the preparation of an annual budget and its submission for sanction, and the reports and returns which shall be furnished by the market committee ;
- (viii) the disposal of any surplus funds of the market committee ;
- (ix) generally for the guidance of the market committee.

(3) Any such rules may, when necessary, provide that any contravention thereof or of any of the conditions of any license issued thereunder shall on conviction by a magistrate be punishable with fine which may extend to five hundred rupees.

* (4) All rules made under this section shall be subject to previous publication and shall, when made, be laid on the table of the Bombay Legislative Council for one month previous to the next session thereof and shall be liable to be rescinded or modified by a motion of the said Council tabled at the next session.

7. Subject to any rules made by the local Government under the last preceding section and with the previous sanction of the Commissioner, ^{By-laws.} the market committee may, in respect of the cotton market under its management, make by-laws for the regulation of the business and the conditions of trading in such market and may provide that contravention thereof shall on conviction by a magistrate be punishable with fine which may extend to fifty rupees.

8. The market committee may appoint one or more of its members to be a sub-committee or to be a joint committee for the conduct of ^{Sub-committees and joint committees and delegation of powers.} any work or works or to report on any matter or matters, and may delegate to any one or more of its members such of its own powers as may be necessary.

9. (1) The market committee may employ such officers and servants as may be necessary for the management of the cotton market and may ^{Appointments and salaries of servants of the market committee.} pay such officers and servants such salaries as the committee thinks fit. The committee may, in the case of any officer or servant of Government which it employs, pay such pension contribution, gratuity or leave allowance as may be required by the regulations made by Government in this behalf and for the time being in force.

* Clause as amended at the second reading ; the amendments have been taken from the Official Report of Bombay Legislative Council Debates.

(2) The committee may also in the case of any of its officers and servants provide for the payment to them of such leave allowances pensions or gratuities as it deems proper and may contribute to any provident fund which may be established for the benefit of such officers and servants

(3) The powers conferred by this section on the market committee shall be exercised subject to any rules which may be made in this behalf by the local Government

10 (1) Every contract entered into by the market committee shall be in writing and shall be signed on behalf of the market committee by the chairman and two other members of the market committee

(2) No contract other than a contract executed as provided in sub section (1) shall be binding on a market committee

*11 All monies received by a market committee shall be paid into a fund to be called the Market Committee Fund and all expenditure incurred by the market committee under or for the purposes of this Act shall be defrayed out of the said fund and any surplus remaining after such expenditure has been met shall be invested as may be prescribed in the rules made in this behalf

*12 Subject to the provisions of Section 11 the market committee fund shall be expended for the following purposes only —

- (i) the maintenance and improvement of the cotton market
- (ii) the construction and repair of buildings which are necessary for the purposes of such market and for the health convenience and safety of the persons using it
- (iii) — — — — — a provident fund for the market

committee and

- (iv) the expenses of and incidental to elections

12 No trade allowance other than an allowance prescribed by rules or by Act shall be made or received by any

not so prescribed

* Clause as amended at the second reading the amendments have been taken from the Official Report of Bombay Legislative Council Debates

- (x) the preparation of plans and estimates for works proposed to be constructed partly or wholly at the expense of the market committee, and the grant of sanction to such plans and estimates ;
- (xi) the form in which the accounts of the market committee shall be kept, the manner in which they shall be audited, and the time or times at which they shall be published ;
- (xii) the preparation of an annual budget and its submission for sanction, and the reports and returns which shall be furnished by the market committee ;
- (xiii) the disposal of any surplus funds of the market committee ;
- (xiv) generally for the guidance of the market committee.

(3) Any such rules may, when necessary, provide that any contravention thereof or of any of the conditions of any license issued thereunder shall on conviction by a magistrate be punishable with fine which may extend to five hundred rupees.

*(4) All rules made under this section shall be subject to previous publication and shall, when made, be laid on the table of the Bombay Legislative Council for one month previous to the next session thereof and shall be liable to be rescinded or modified by a motion of the said Council tabled at the next session.

7. Subject to any rules made by the local Government under the last preceding section and with the previous sanction of the Commissioner, ^{By-laws.} the market committee may, in respect of the cotton market under its management, make by-laws for the regulation of the business and the conditions of trading in such market and may provide that contravention thereof shall on conviction by a magistrate be punishable with fine which may extend to fifty rupees.

8. The market committee may appoint one or more of its members to be a sub-committee or to be a joint committee for the conduct of any work or works or to report on any matter or matters, and may delegate to any one or more of its members such of its own powers as may be necessary. ^{Sub-committees and joint committees and delegation of powers.}

9. (1) The market committee may employ such officers and servants as may be necessary for the management of the cotton market and may pay such officers and servants such salaries as the committee thinks fit. The committee may, in the case of any officer or servant of Government which it employs, pay such pension contribution, gratuity or leave allowance as may be required by the regulations made by Government in this behalf and for the time being in force. ^{Appointments and salaries of servants of the market committee.}

* Clause as amended at the second reading ; the amendments have been taken from the Official Report of Bombay Legislative Council Debates.

(2) The committee may also, in the case of any of its officers and servants, provide for the payment to them of such leave allowances, pensions or gratuities as it deems proper, and may contribute to any provident fund which may be established for the benefit of such officers and servants

(3) The powers conferred by this section on the market committee shall be exercised subject to any rules which may be made in this behalf by the local Government

10 (1) Every contract entered into by the market committee shall be in writing and shall be signed on behalf of the market committee by the chairman and two other members of the market committee

Contracts now executed

(2) No contract other than a contract executed as provided in sub section (1) shall be binding on a market committee

*11 All monies received by a market committee shall be paid into a fund to be called the "Market Committee Fund" and all expenditure incurred by the market committee under or for the purposes of this Act shall be defrayed out of the said fund and any surplus remaining after such expenditure has been met shall be invested as may be prescribed in the rules made in this behalf

The market committee fund

*12 Subject to the provisions of Section 11 the market committee fund shall be expended for the following purposes only —

Purposes for which the market committee and may be expended

- (i) the maintenance and improvement of the cotton market
- (ii) the construction and repair of buildings which are necessary for the purposes of such market and for the health convenience and safety of the persons using it,
- (iii) the pay, pensions, leave allowances gratuities and pensions or provident fund contributions of the officers and servants employed by the market committee, and
- (iv) the expenses of and incidental to elections

13 No trade allowance, other than an allowance prescribed by rules or by-laws made under this Act, shall be made or received by any person in any transaction in a cotton market established under this Act, and no Civil Court shall, in any suit or proceeding arising out of any transaction in any such cotton market, have regard to any trade allowance not so prescribed

No trade allowance not recognised by custom or rules allowable

failure of the crop and of the falling prices of the past two years is reflected in the areas sown in 1927 which were :—

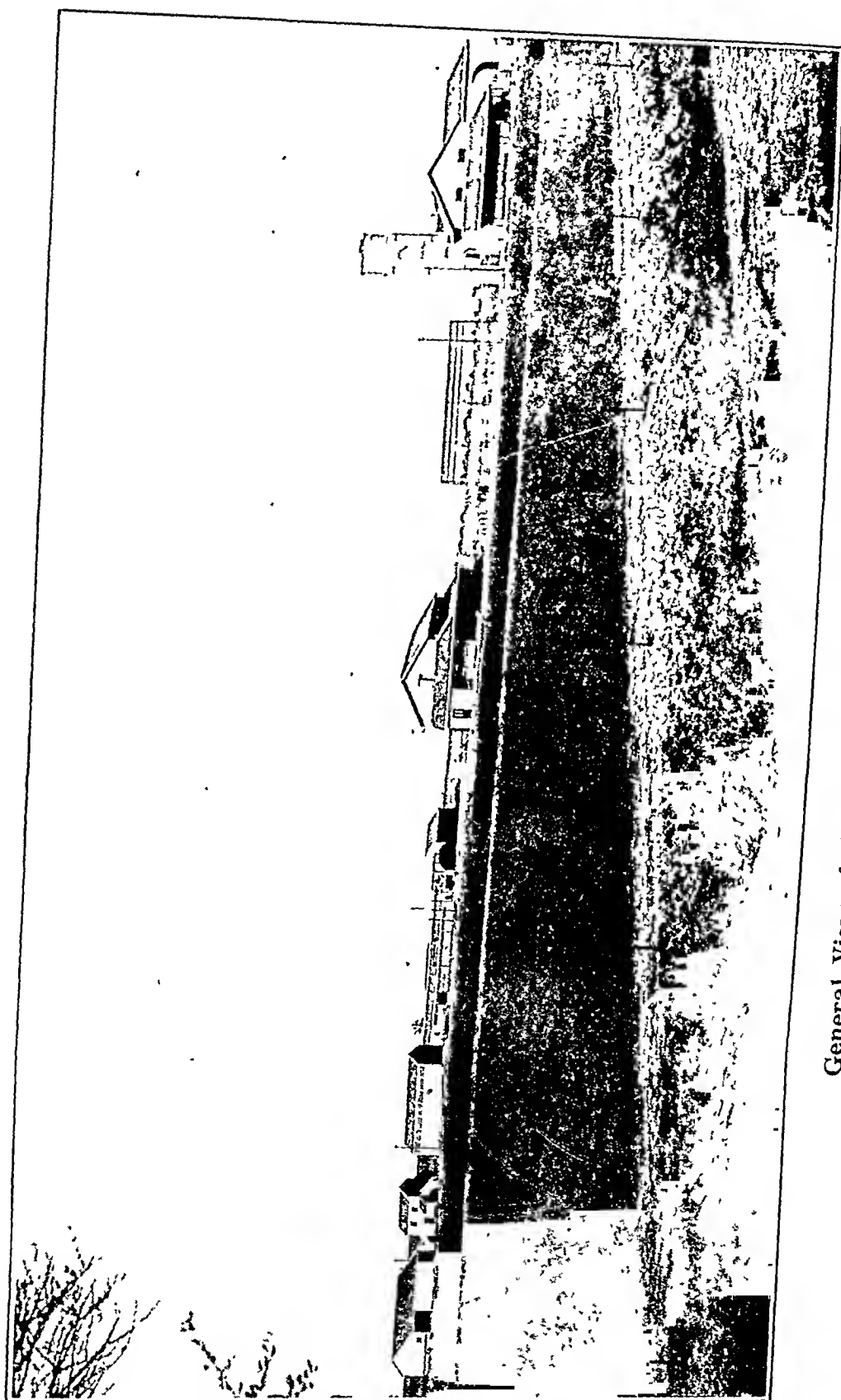
Dasi cotton 1,094,100 acres, American cotton 970,100 acres, as compared to 1,385,400 and 1,134,600 acres respectively in 1926-27.

Burma.—The abnormal character of the season caused a serious set-back in the work. In the early part of the rains there was a long period of drought while the late rains were excessive, the total rainfall for the year being 50 inches against an average of 30 inches. The effect of this on the cotton crop of the province may be seen from the fact that only 44,400 bales were exported against 88,258 of last year. Work on the improvement of the varieties proceeded at the Mahlaing and Allanmyo farms. There is, however, no increase to register under improved Wagale and the area under Cambodia is decreasing on account of the fall in price and the insufficient premiums paid. This variety is extremely subject to insect and fungus attack which appears to be the only real obstacle to its spread in certain areas of the province. The difficulties encountered in the spread of the improved indigenous cotton—Wagale—are serious in the case of a season which like the last was largely a failure. The matter is receiving careful attention and the help of the Co-operative Credit Department is being enlisted in an attempt to accelerate progress.

Hyderabad State.—The distribution of seed of the Hyderabad Gaorani (Bani) type was continued in districts Parbhani and Bir, the policy being to maintain this valuable indigenous staple cotton and to exclude inferior varieties so far as possible. At present the major portion of the Nanded District grows *Gaorani* and also the south of the Parbhani District and parts of districts Bidar, Bir and Osmanabad.

Baroda State.—The State has for several years consistently followed the policy of co-operating with the Bombay Department of Agriculture in its attempts to improve the quality of the Surat cottons by introducing the 1027 A.L.F. variety. This policy was continued in such areas of the State as are interlaced with those areas dealt with by the Bombay Department of Agriculture in the Surat and South Surat areas. Attention has now been turned northwards and over 231,000 lbs. of improved cotton seed 1027 A.L.F. was distributed, chiefly in Mangrol Taluka. It is intended to make special efforts to replace as much of the cotton area in Mangrol with improved cotton seed as possible.

Rajpipla State.—The Rajpipla State has continued its policy of maintaining the improved strain 1027 A.L.F. as a pure crop throughout the State. No other variety is now grown in the State and purity is maintained by the annual distribution of selected seed obtained by special arrangement from the Bombay Department of Agriculture, by the Cotton Transport Act and by control of the ginning and pressing factories. As a result Rajpipla cotton is now recognised as equal to the very best type of Surat cotton and is much sought after.



General View of the Institute Buildings and Land.

APPENDIX XI.

INSTITUTE OF PLANT INDUSTRY, INDORE

Annual Report for the year ended 30th June 1927.

I INTRODUCTION

IN 1922, the Indian Central Cotton Committee resolved that a Central Agricultural Institute for cotton research should be established. The Committee had previously decided to recommend to the Government of India that they should be permitted to contribute from Cotton Cess Funds to a proposed Plant Breeding Institute at Indore which was then under consideration. When the original scheme for this Institute at Indore fell through on account of financial stringency, the Committee approved of a revised scheme for an Institute to be chiefly devoted to cotton investigations. The cost of this scheme was to be met from a capital grant of two lakhs and an annual recurring grant, limited to one lakh from the Indian Central Cotton Committee and by a combined recurring grant contributed each year by the Durbars of certain Central India States.*

The Institute of Plant Industry, Indore is the direct outcome of this scheme. Work at the Institute may be said to have started definitely from the 27th October 1924 on which date Mr A. Howard, M.A. C.I.E., assumed charge as Director of the Institute and Agricultural Adviser to the States of Central India.

This report therefore, deals with the third year of the existence of the Institute and it may be interesting to note that within so short a period of time, the erection of the Institute buildings and fittings, the construction of roads and drains, the fencing and laying out of the estate have been completed and considerable progress has been made in the work for which the Institute was founded.

The third meeting of the Board of Governors took place at Indore on January 31st, 1927.

Those members who attended were —

- (1) The Hon'ble Mr R. I. R. Glancy, C.S.I., C.I.E., I.C.S., Agent to the Governor General in Central India—(*President*).
- (2) Dr D. Clouston C.I.E., Agricultural Adviser to the Government of India,
- (3) Mr B. C. Burt, M.B.E., F.C.S., Secretary, Indian Central Cotton Committee Bombay,
- (4) Mr C. R. Palaret, Member for Commerce and Industry Holkar State,
- (5) Mr C. K. Chhaya, Agricultural Superintendent Dhar,
- (6) Mr Amarnath Katju, Revenue Secretary, Jaora, and
- (7) Mr A. Howard C.I.E. Director of the Institute of Plant Industry, Indore, and Agricultural Adviser to States in Central India—(*Secretary*).

* Indore, Datia, Dhar, Dewas (*Senior*) Rutlam, Jaora, Sitamau and Narsingarh.

Sir Parshotamdas Thakurdas, Kt., C.I.E., M.B.E., M.L.A., was unable to attend on account of the session of the Legislative Assembly at Delhi.

At this meeting, a final report on capital expenditure* amounting in all to Rs. 2,32,133-0-10 was approved and sanctioned. The Director announced that a further capital grant of Rs. 33,333 had been placed at the disposal of the Board of Governors by the Indian Central Cotton Committee for the purpose of completing the roads on the estate and for the erection of fourteen staff quarters for ploughmen, etc.

The Board of Governors accorded sanction to the staff of the Institute and their pay† as finally submitted by the Director.

The Budget for 1927-28‡ was passed and proposals for the utilization of anticipated savings under current expenditure (1926-27) were discussed and approved.

The Board of Governors considered the present system of accounts and audit of the Institute funds under excluded local fund rules. They decided that this system is unsuited to the needs of a Research Institute. The Director was asked to submit formal proposals for submission to the Government of India that the present excluded local fund system be terminated and that the funds of the Institute be placed in the Imperial Bank of India, Indore, and operated upon by cheque. The general control of the funds should vest in the Board of Governors of the Institute and a commercial audit should be carried out twice yearly by a firm of chartered accountants. To implement this change in financial administration, it will be necessary to incorporate the Board of Governors of the Institute. Subject to the approval of the Government of India this will be done by registration of the Institute under the Societies' Registration Act, recently enacted by the Holkar State.

During the year under report two additional States intimated their decision to enter the scheme and to contribute to the funds of the Institute. These States are Tonk (Rajputana) and Bijawar (Bundelkhand)

II. STAFF.

Mr. A. Howard, M.A., C.I.E., Director, Institute of Plant Industry, and Mrs. G. L. C. Howard, M.A., Second Imperial Botanist (on deputation) went on long leave from May 5th, 1927. Mr. W. J. Jenkins, M.A., B.Sc., Deputy Secretary, Indian Central Cotton Committee, was appointed to officiate as Director during Mr. Howard's absence.

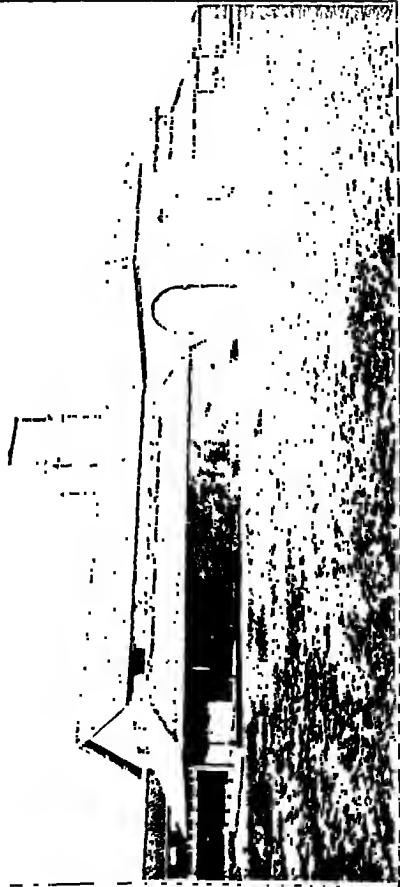
During the year under report, the following additional appointments were made to the staff of the Institute :—

Dr. R. D. Rege, Ph.D., M.Sc., B.A., Chief Assistant in Agricultural Chemistry. (1st March 1927.)

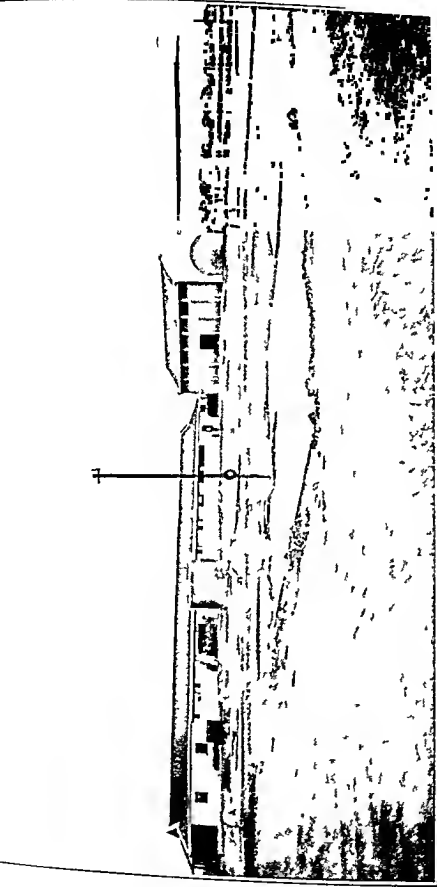
* Appendix A,

† Appendix B,

‡ Appendix C,



Main Building, Entrance, Library and Chemical Laboratory.
(From the West.)



Farm Yard, Cattle Shed and Fodder Barns

Mr Misri Lal Saxena, L Ag, F I C S, Personal Assistant to the Director,
(8th April 1927)

A complete list of the sanctioned staff of the Institute is given in Appendix B

Mr K R Joshi, L Ag, Assistant in-charge of experiments and seed farm,
went on leave from 15th April 1927 to 2nd June 1927, during which period his
duties were ably carried out by Mr B C. Tambe, B Ag, Junior Assistant

Two sanctioned posts of a Senior Assistant for Plant Breeding and an Artist
are not being filled at present

III BUILDINGS AND LAND, ETC

(a) Buildings

The construction of all the Institute and farm buildings has now been com-
pleted. Two blocks of workmen's quarters and two additional chowkidars' houses
were built during the year

The photographs attached to this report will give a general idea of the lay-
out of the buildings and of the more important constructions

A pot culture house and a retiring room for the Institute staff with a brick
work lattice screen are being constructed out of savings from current expenditure,
1926-27. These will be completed and in use at an early date. The estimated
cost of these additional buildings is Rs 4 000

The electrification of the Institute is complete and the various cotton gins
have been connected to the motors and are working successfully

The Institute wells have given an ample supply of water during the year and
records are being regularly maintained of the water levels in each of the six wells
on the estate

Certain minor repairs and alterations to the staff and students' quarters in the
old Thagi Jail have been carried out in order to make these buildings more habitable
during the rainy season

(b) Land

During the year under report, the remaining portion of the Institute area
lying north of the Pipra road was laid out and the entire estate is now sub divided
into forty five plots the sizes of which have been verified and placed on record in
final plan. All the plots have been numbered and delimited by white corner
stones which bear the plot numbers

The road scheme of the Institute has been completed* and the final surface to
be metalled roads will be applied during the rains of 1927-28. The estate now
possesses 6 300 yards of good metalled roads which immensely facilitate transport
and supervision

* This work in addition to the construction of fourteen workmen's and chowkidars'
quarters was met from the special Capital Grant of Rs 33 333 received from the Indian
Central Cotton Committee

The fencing (31,751 feet) of the Institute lands has now been completed.

Several new drains have been dug in situations where experience during last monsoon showed them to be necessary. Many of the existing drains have been widened and deepened and the whole area is now effectively drained and protected against water-logging by a system of surface drains leading into small drainage canals.

A considerable amount of levelling was done during the year and this work, combined with the blocking and filling up of erosion nullahs, has brought additional land into fit condition for cultivation.

Cultivation of the Institute lands was only commenced in the first week of April, 1925. The following figures, which indicate the cropping and utilization of the estate during 1926-27, will testify to the progress made during the last two years :—

(a)	Under kharif crops	..	..	..	..	127.14	acres.
(b)	Under rabi crops	..	..	..	..	52.82	"
(c)	Under irrigated crops	..	..	..	..	10.07	"
(d)	Cultivated fallow*	..	..	..	..	64.22	"
(e)	Grass lands	..	..	..	..	4.75	"
(f)	Under roads, buildings, etc.	..	..	..	..	40.97	"
Total						299.97	"

During the year, much work was done in the construction of irrigation channels. Three plots, amounting in all to 15.28 acres, are laid out for the cultivation of irrigated crops. This area is capable of considerable extension, if required.

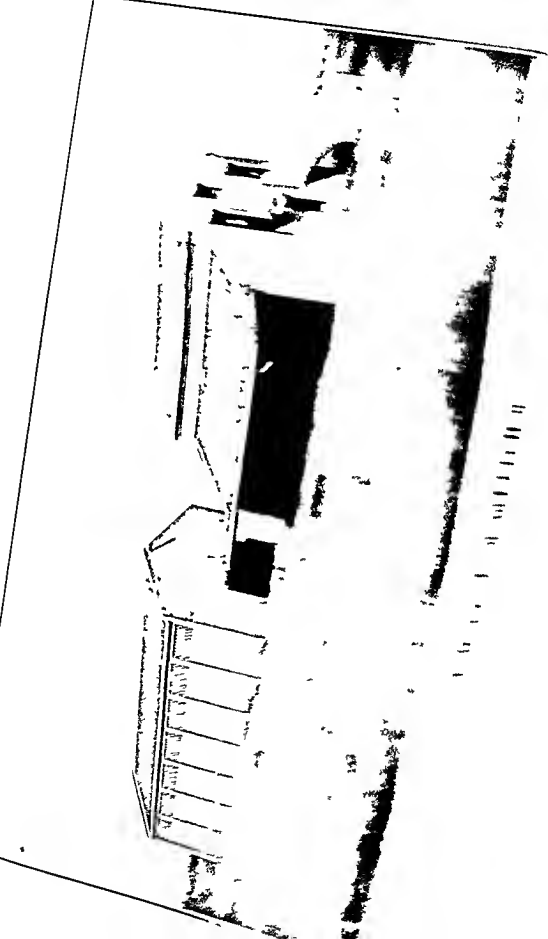
(c) *Library and Laboratories.*

The Institute is now equipped with a useful and up-to-date library, containing 1,300 volumes of periodicals, 700 text-books and works of reference, 500 volumes of foreign bulletins and reports and 1,100 scientific publications, reports and bulletins of the Government of India and the various Provincial Governments. 70 periodicals, dealing with agriculture, botany, chemistry, genetics and allied subjects are being received.

Much progress has been made in completing incomplete sets of periodicals, journals, etc., and 382 volumes of such publications have been made up and bound at the Institute. The work of binding all the loose sets of scientific publications in the Library will be completed by the end of June, 1927.

The equipment of the various laboratories at the Institute is now well advanced and is being gradually completed in accordance with the requirements of the various investigations in progress.

* Practically all this land was under special treatment for "kaps" eradication.



IV THE WORK OF THE YEAR

The rainfall during 1926-27 was five inches below the normal for the tract (33") and its distribution was irregular and uneven. The monsoon broke late and *kharif* sowings could not be commenced until the end of the first week of July. In August continuous heavy rain caused damage to the crops by water logging and excessive humidity. Conditions for the *rabi* crops were also unfavourable owing to insufficient rain in September.

(A) COTTON

(1) *Plant-breeding Work*

Collections of unit species of indigenous cottons have been obtained from various Departments of Agriculture in India and these were grown during the year under report and their various field characters were noted. Sufficient numbers of selfed bolls were obtained from each of these cultures to enable all these species to be grown this season for further study. The isolation and study of these unit species will form the basis for the work of classifying the various species and varieties of cotton found on the black soils. The practical bearing of such work is to be looked for in the possibility of isolating useful types for distribution.

Single plant selections from the isolated constituents of the Malwa mixture grown in 1925-26 were studied critically in the field and their lint characters were examined. This work is directed towards obtaining a higher yielding earlier and better stapled cotton for the Central India tract. Further selections were made for cultivation and study in the coming season.

Selections were made from mixed crops of Bari and Roseum cottons and these are being studied with a view to isolate the various constituents of the mixtures.

A commencement has been made during the year under report of growing samples of *Herbaceum* and *Hirsutum* cottons received from different parts of India and from abroad, under both irrigated and dry conditions of cultivation. This will enable these varieties to be studied in detail and the optimum requirements for their cultivation in Central India will be worked out.

Much valuable information was collected with regard to the root development, the relations of the root system to the soil character and the influence of environmental factors on growth of many of the different cottons grown on the plant-breeding plots.

(2) *Farm Cotton Crop.*

Hitherto the cultivation of the farm lands has been mainly dictated by the necessity of cleaning the fields of deep rooted weeds, breaking up old boundaries and paths, levelling and in general averaging the plots and fitting them for experimental work and general cropping. Whenever possible, a crop was sown in order to keep the land under cultivation and to get some return during this preparatory period.

During the year 73·18 acres of Malwi cotton were grown at the Institute and an average yield of 4·6 maunds per acre was obtained. This yield is not high owing partly to the adverse season and partly to the land being only recently brought into fit condition for growing a crop. It is, however, considerably larger than that of the previous year before the drainage system of the estate had been laid out.

The farm lint (91·95 maunds) was sold to the local mills for Rs. 2,900 approximately.

Experiments were carried out to determine the effect on cotton yield of increasing the manurial application of Karanj (*Pongamia glabra*) cake from five to ten maunds per acre. Owing to the uneven nature of the newly broken-up fields, the results were inconclusive.

Applications of sann (*Crotalaria juncea*) compost at the rate of ten cart-loads per acre gave very definite increases in the yield of *kapas* as compared with the unmanured plots.

The effect of good surface drainage of the fields on the yield of the cotton crop was most strikingly demonstrated during the year, which, as is mentioned above, was characterized by prolonged heavy rains during the month of August. As a further step to assist surface drainage experimental plots were laid out in which cotton was grown on flat beds of varying widths. The results obtained justify the continuance of this work and it is being repeated, with suitable modifications, during the coming year.

Ratooning of cotton, which is sometimes practised on opium lands, was done over an area of 2·22 acres. This area yielded 13 maunds 8 seers of *kapas*, an increase of one maund over the crop obtained in the first year. The ratoon crop was also a month earlier in maturing.

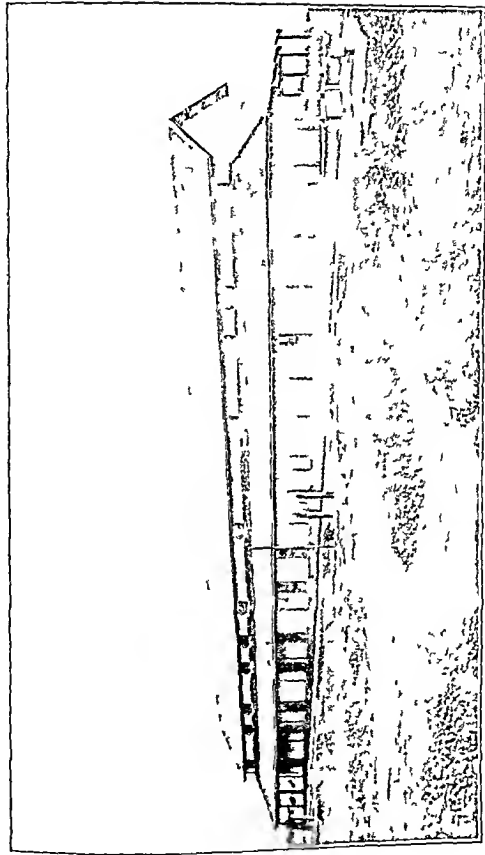
(B) MISCELLANEOUS WORK.

(1) *Kans* Eradication.

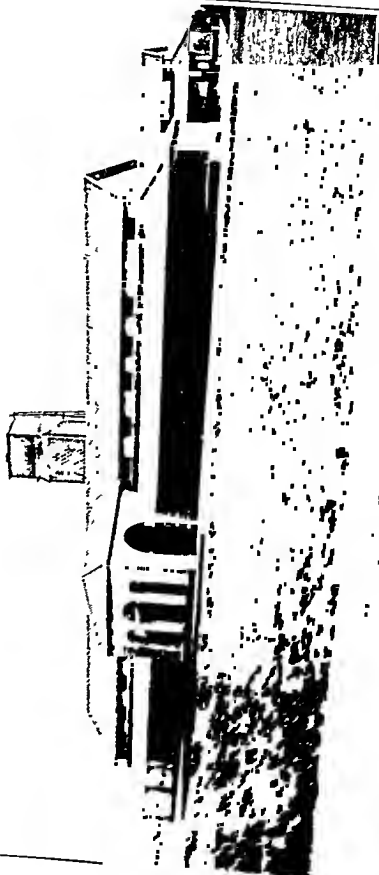
As mentioned in last year's report, most of the farm area, when taken over, was badly infested with "kans" (*Saccharum spontaneum*. L.). By the use of the adjustable bakhar (altered P. & O. 10" Middle Buster Plough) devised at the Institute, an area of 35 acres was cleared of this obstacle to cotton cultivation during the year. The method employed and the bakhar with the four-bullock yoke have been described in leaflets which are available at the Institute.

The "kans" eradicator and the four-bullock yoke were demonstrated at the Bombay Presidency Agricultural Show, Poona, in October 1926, in connection with the Indian Central Cotton Committee's exhibit. These implements aroused much interest and, during the year, 14 complete middle busters, 28 sets of conversion parts, 30 four-bullock yokes and twenty chains with hooks have been supplied from the Institute to different inquirers.

Blue prints, illustrating the dimensions of the four-bullock yoke, which can be manufactured in any village,—are available at the Institute at Re. 1 each.



Director's Office and Laboratories



Entrance and Library
(New York East.)

(2) *Soil Colloids and Cotton Cultivation.*

It was reported that the results of the experiments conducted at the Institute were as follows:

oil cakes in a finely divided condition was discussed and the arrangements made at Indore to grow karanj plantations to provide a supply of karanj cake for manurial purposes at the Institute were described

The Chemical Assistant at the Institute has now commenced a series of investigations into the effect of different oil cake manures on soil colloid formation and is combining field tests with laboratory research with a view to find out the reasons underlying the favourable action of certain oil cakes on colloid formation in the soil

(3) *The Preparation of Organic Manure for the Cotton Crop*

Experiments were carried out with cotton stalks and other waste organic materials to try and evolve a practical method of converting these by products of cultivation into a suitable manure for the cotton crop. This work is not yet completed but from the results already obtained it appears certain that decomposition which is essential to the preparation of a finely divided organic manure can only be satisfactorily obtained if the raw materials are firstly broken up into small pieces passed through the cattle shed as bedding and then stored in pits to which an adequate supply of water is made available. After such treatment even hard woody fibrous material such as cotton stalks decomposes satisfactorily.

It is beyond doubt that the general utilization of cattle and the cattle shed in this way as a manure factory for the production of suitable organic manures from waste materials for the cotton crop would lead to a considerable increase in cotton production.

10 to 30 acres of sann (*Crotalaria juncea*) was grown during the year and utilized for making sann compost. It was found that sann allowed to wither and then composted with urine earth from the cattle sheds decomposed more completely and in a shorter time than by any other method. It is most essential to aerate the compost heaps thoroughly with wooden ventilators to avoid reduction changes and losses of nitrogen.

(4) *Ensilaging of Jowar Fodder*

In order to provide additional fodder for the work bullocks 24 acres of jowar were grown and ensilaged in six pits. The inside of the pits was plastered with mud and cow dung to make them as airtight as possible. Previous to filling the pits the jowar was cut into pieces about 3" long by the bullock reaper chaff cutter. The fodder was taken to the chaff cutter immediately after harvesting and the size of the pits (1300 cubic feet) was arranged so that the chaffing of the jowar and the filling of the pits could be carried on at the rate of one pit per day. It was found advisable to moisten the material in the pits during filling and before closing. The pits were covered with 6" of earth mixed down with heavy stones and were finally plastered over and made as airtight as possible. The silage produced was of excellent quality and was a valuable addition to the cattle rations when green food was otherwise unobtainable.

V. RESEARCH STUDENTS.

One of the most important functions of the Institute is to train research students in different branches of agricultural research, especially in connection with the improvement of cotton.

At the present time, there are seven Research Students (two Senior and five Junior), appointed by the Indian Central Cotton Committee, working at the Institute. The names of these students, the dates of their appointment to scholarships and a brief note on the nature of the investigations on which each of them is engaged, are appended to this report.*

It is gratifying to note that Mr. B. B. Desai, B.Ag., Senior Research Scholar at the Institute, has recently been appointed to the post of Cotton Breeder in Sind under the Government of Bombay. He has resigned his scholarship with effect from 5th June, 1927.

The Indian Central Cotton Committee, at its fourteenth meeting on the 24th-26th January, 1927, decided to award an additional scholarship in cotton agronomy, tenable at the Institute of Plant Industry, Indore. This scholarship has been awarded to Mr. Shamsheer Singh, M.Sc., who is expected to join for duty shortly.

In the first Annual Report of the Institute of Plant Industry, Indore, Mr. Howard discussed the question of creating and maintaining an effective contact between the work of the Institute and its subscribers. He laid much stress on the value of periodic visits to the Institute in order to see the work in progress and to overcome the difficulties caused by the limitations of written reports.

During the past year, the Standing Finance Sub-Committee of the Indian Central Cotton Committee held one of its meetings at Indore and the members were conducted round the Institute and shown the work done and in progress. This visit was particularly gratifying and it is hoped that it will lead to a full Meeting of the Committee being held at Indore in the near future.

Arrangements are being made to bring the contributing States in Central India into more personal touch with the work of the Institute by arranging for visits of officials and cultivators. Such visits are always welcome, as a very necessary supplement to the circulation of printed leaflets and reports and will assist considerably in establishing the Institute as a real centre of agricultural improvement in Central India.

(Sd.) W. J. JENKINS,

*Officiating Director, Institute of Plant Industry, Indore, and
Agricultural Adviser to States in Central India, Indore.*

APPENDIX A

Final Statement of Capital Expenditure (31st January 1927)

HEAD OF CHARGE

FIRST GROUP

	Expenditure		
	Rs	a	p
(1) Institute Buildings	1 05	794	9 11
(2) Furniture and Fittings	33	163	12 7
(3) Well with engine and pump	10	053	10 3
(4) Purchase of cattle	6	558	12 3
(5) Compensation to Indore Durbar	10	075	3 0
(6) Fencing	14	724	4 0
(7) Alterations to Staff quarters	3	099	0 0

SECOND GROUP

(1) Furniture and shelving	3	618	6 10
(2) Electricity	5	000	0 0
(3) Motors	1	935	3 0
(4) Experimental gins and workshop	5	455	6 0
(5) Cotton gins	2	561	8 0
(6) Workshop fittings	5	25	11 2
(7) Retining room at Farm	2	00	0 0
(8) Scientific Apparatus	11	799	6 3
(9) Bullock Gear etc	1	223	55 7
(10) Seed bins and drying boxes	6	50	1 11
(11) Wire netting and drying houses	3	924	15 1
(12) Neemuch stone threshing floors	2	15	1
(13) Pucca roads and culverts	1	1	1
(14) Chowkidar s house	1	1	1
TOTAL	122	15	11

APPENDIX B.

Sanctioned Staff of Institute and their Pays, etc

Post and Incumbent.		Date of Appoint- ment.	Rate of pay. Rs.
(1)	Assistant in charge of experiments and seed farm. (K. R. Joshi, L.Ag.)	3-2-25	200-25-375
(2)	Personal Assistant. (M. L. Saxena, L.Ag., F.I.C.S.)	8-4-27	200-25-375
(3)	Assistant for Plant Breeding. (Appointment not yet made) .. .. .	.. .. .	250-25-375
(4)	Chemical Assistant. (Dr. R. D. Rege, Ph.D., M.Sc., B.A.)	1-3-27	300-25-375
(5)	Junior Assistant (Farm). (G. C. Tambe, B.Ag.)	1-7-25	150-10-300
(6)	Junior Assistant (Plant Breeding). (Kuber Singh, B.Ag.)	1-4-25	120-10-300
(7)	Senior Fieldman. (Nihal Singh)	1-12-26	60-5-125
(8)	Junior Fieldman. (V. R. Sathe)	11-12-24	40-5-75
(9)	Junior Fieldman (Cattle and Farmyard) (Yakub Ali)	24-4-26	35-3-50
(10)	Librarian. (B. Hussain Khan)	1-3-26	100-5-150
(11)	Artist. (Appointment not yet made) .. .. .	.. .. .	100-5-150
(12)	Senior Clerk. (Arjun Nath)	1-6-25	120-5-150
(13)	Junior Clerk. (N. P. Vyas)	9-12-24	50-5-75
(14)	First Mistry. (Mohamed Abdul)	14-3-26	60-5-75
(15)	Second Mistry. (Irshad Ali)	1-3-27	30-2-50
(16)	Store-keeper. (O. Trivedi)	1-4-26	50-5-75
(17)	Laboratory-keeper. (Jagganath Prasad)	9-3-26	30-2-50
(18)	Jamadar .. .. .	.. .. .	30-0-0
	3 Peons .. .. .	.. .. .	15 each
(19)	Head Watchman (not yet appointed) .. .. .	.. .. .	20-0-0
	3 Watchmen (Two appointed) .. .. .	.. .. .	15 each
(20)	Farash .. .. .	.. .. .	13-1-15
(21)	Sweeper .. .. .	.. .. .	13-1-14

APPENDIX C.

BUDGET FOR 1917-28.

A. INCOME.

	Rs.	a.	p.
(1) Grant from Indian Central Cotton Committees	1,00,000	0	0
(2) Contributions from Central India States	20,800	0	0
(3) Income from land and other miscellaneous receipts ..	6,000	0	0
Total Receipts ..	1,26,800	0	0

B. EXPENDITURE.

	Rs.	a.	p.
(1) Director and Agricultural Adviser to States in Central India	29,740	0	0
(2) House Allowance at Rs. 150 p.m.	1,800	0	0
(3) Second Imperial Economic Botanist (on deputation) ..	18,040	0	0
(4) Leave and Pension Contribution at 30% of pay for officers on loan from Government of India	14,150	0	0
(5) Pay of Staff	11,850	0	0
(6) Leave and Pension Contribution of Staff	750	0	0
(7) Provident Fund for Staff at 1 1/2 pay	720	0	0
(8) Medical Attendance for Staff and Employees	360	0	0
(9) Rent of land leased by the Indore Durbar	300	0	0
(10) Fire Insurance and Protection	1,000	0	0
(11) Audit Expenses	3,000	0	0
(12) Plant Breeding and Cultivation	15,000	0	0
(13) Purchase and upkeep of Machinery	3,000	0	0
(14) Laboratory Apparatus	3,000	0	0
(15) Books and Periodicals	3,000	0	0
(16) Miscellaneous (Postage, Stationery, Furniture, etc.) ..	3,000	0	0
(17) Travelling Allowances	1,000	0	0
(18) Publications	1,000	0	0
Total Expenditure ..	1,24,710	0	0

APPENDIX D.

(A) SENIOR RESEARCH SCHOLARS.

1. Mr. B. B. Desai, B.Ag.* (1-7-26).—Has been working out the life-history of kans (*Saccharum spontaneum*. L.), a deep-rooted weed which is a great obstacle to cotton cultivation in Central India. Very good progress has been made in this work resulting in the devising of simple and effective methods of eradication.
2. Mr. I. Bannerji, B.Sc., M.Sc. (1-4-26, joined at Indore, 21-3-27).—Has been making a critical study of the chromosome numbers in Indian cottons† and is investigating cytologically the factors which interfere with the successful crossing of American and Indian cottons. The process of fertilisation in cottons is also being studied. He will study the effect of aeration on the setting of seeds in cotton (dry and irrigated). During the coming season, he will make preliminary investigations on boll shedding in cotton under Malwa conditions.

(B) JUNIOR RESEARCH SCHOLARS.

1. Mr. H. A. Idnani, B.Ag. (6-6-26).—Has been carrying out investigations on the root development of different varieties of cotton under varied soil conditions in the Malwa tract. Has also assisted in cultural experiments on the cotton crop and has maintained regular records of the water levels in the various wells on the Institute estate. Is abstracting literature on root development.
2. Mr. S. C. Talesera, B.Ag. (14-6-26).—Has worked on the breeding of cotton varieties with the Botanical Assistant and on the examination of botanical characteristics of the different varieties of cotton grown at the Institute. Has made a study of the root development of various types of cotton. In addition, has conducted experiments on different methods of composting and on the utilization of waste materials, e.g., cotton stalks, for manurial purposes.
3. Mr. A. K. Thakur, B.Sc. (1-3-27).—Will work in collaboration with the Director on the completion of the life-history of Kans and will investigate its root development during the rains and the chemical nature of the reserve material in the underground rhizomes and its changes during cultivation.
4. Mr. S. S. Rane, M.Sc. (1-4-27).—Is at present working out the root system of the ordinary date palm (*Phoenix sylvestris*) and obtaining experience in research technique. In addition, during the rains, he will take up the investigation of the connection between root development and "red leaf" in Cambodia cotton.
5. Mr. L. N. Mathur, B.Sc., M.Sc. (1-4-27).—Is working in collaboration with the Botanical Assistant, on cotton cultures (dry and irrigated). Also conducts lint examinations in the laboratory. Is preparing an index (with abstracts) of cotton publications and papers in the Library.

* Recently appointed Cotton Breeder in Sind under the Government of Bombay.

† This work was commenced at Bangalore in August, 1926, and will be completed at Indore.

PROGRAMME OF FUTURE WORK OF THE INSTITUTE.

The programme of cotton investigations submitted to the Central Cotton Committee in 1923 is given below —

The aim of the Indore Institute (as regards cotton investigations) is to provide a centre of research for the black soil tracts. At this centre any problems suggested either by the Central Cotton Committee or by other workers in India can be taken up. A special effort will be made to create a good library dealing with the various aspects of cotton production for the use not only of workers at the Institute itself but also of other investigators on cotton in India.

While the Institute will always be prepared to consider any useful suggestions as regards problems to be investigated, the following preliminary programme is put forward. This falls into four parts.

(a) *Botanical Survey* —Up to the present, little or no attempt has been made in India to isolate, classify and study the unit species which form the frame-work of the various species and varieties of cotton found on the black soils. It is true that the Indian cottons have been classified and surveyed from the point of view of systematic botany, but this is entirely inadequate for modern work as by this method cottons of very different agricultural value are not distinguished. The work needs to be carried much further and nothing short of the isolation and study of the unit species will meet the case. This work has a direct practical bearing. It will in all probability lead to the isolation of useful types for distribution. It will also provide material for the plant breeder and for critical work on the physiology and agronomy of cotton.

(b) *Plant Breeding* —Two main practical problems will be taken up at once, —

(1) the creation, establishment and maintenance of an island of long staple cotton on the Malwa plateau. The types isolated will be available for other areas in India and the crop will enable a grade of improved cotton to be established for the mills and for the shippers,

(2) the improvement of the fibre of the hardy Roseum type which is, in all other respects, admirably suited for the low — — — — — of India.

In the — — — — — studied

— — — — — have to be — — — — — but will also be of general interest

(c) *The Physiology of the Cotton Crop* —In order to increase production something more than improved varieties is needed. The new varieties must be provided with suitable conditions for growth. To discover these the physiology of the cotton plant must be studied and the factors which now limit production must be determined. This involves the study of root development, the relations of the root system to the soil type and the influence of factors such as soil moisture, soil aeration and drainage, soil texture and soil temperature on growth. Included in these studies is the discovery of factors which produce the shedding of buds, flowers and bolls. During the course of these physiological studies, the general nutrition of the cotton plant will be considered and how far the yield can be improved by manuring and other methods of soil treatment.

(d) *The Influence of Environmental Factors on the Lint Characters.*—Modern industries demand a uniform product. Once this is obtained the purchase of raw material as well as the details of manufacture are simplified. In the case of cotton, any tract which can produce uniform lint will rapidly establish its reputation in the trade. It is well known, however, that the cotton fibre alters in character according to the soil on which it grows and to some extent according to the season. Further work is desirable on this matter with the object of discovering what factors bring about these changes, which varieties are most easily affected and whether any practical remedies exist for improving the uniformity of the fibre of the same cotton. This portion of the work is of direct bearing on the question of the maintenance of grades of cotton for the highest class of spinning in this country.

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED MARCH 31ST 1927

RECEIPTS

	Rs	a	p
Opening Balance	24	13	100 14 4
Receipts under Section 12 of the Indian Cotton Cess Act 1923	6	94	814 4 11
† Other Receipts	16	316	3 11
Interest on Investments	1	22	898 15 9

EXPENDITURE

	Rs	a	p
I Administration of the Committee	1	48	766 15 1
II Agricultural Research Grants in Aid	3	29	122 3 7
III Technological Research	1	42	657 4 8
IV Cash and other Balances (Government Paper at cost)—			
31% Government Promissory Notes of the Face Value of Rs 9 49 500	6	51	209 11 0
5% Taxable Loan 1935 of the Face Value of Rs 7 00 000	6	63	556 4 0
5% Taxable Loan 1929 of the Face Value of Rs 7 88 000	7	65	270 12 10
16% Bombay Municipal Bonds 1954 Fixed and Call Deposits (with approved Banks)	56	500	0 0
Imperial Bank of India Limited Current Account	2	75	000 0 0
Imprest—Committee's Account (certified by the Secretary)	2	02	726 4 9
Imprest—Technological Laboratory Punjab (certified by the D T L)	1	502	5 0
Research Botanist	500	0	0
Suspense (Recoverable)	500	0	0
† Total closing balance	9	858	10 0

Total Rs 32 47 120 6 11

* Includes Rs 15 884 3-0 Balance of Provident Fund
 † This amount includes Rs 14 855-9 10 on account of contribution to the Committee's Provident Fund
 ‡ Deposited with the Imperial Bank of India Limited for security against any overdraft that may be required by the
 § Includes Rs 30 739-12 10 of Provident Fund
 We have examined the above statement of Receipts and Expenditure of the Indian Central
 at to the best of our information and explanations received the above statement
 books and is drawn up in conformity with the Rules under the
 10th April 1927

Total Rs 26 26 573 15 7

3 47 120 6 11

(d) *The Influence of Environmental Factors on the Lint Characters.*—Modern industries demand a uniform product. Once this is obtained the purchase of raw material as well as the details of manufacture are simplified. In the case of cotton, any tract which can produce uniform lint will rapidly establish its reputation in the trade. It is well known, however, that the cotton fibre alters in character according to the soil on which it grows and to some extent according to the season. Further work is desirable on this matter with the object of discovering what factors bring about these changes, which varieties are most easily affected and whether any practical remedies exist for improving the uniformity of the fibre of the same cotton. This portion of the work is of direct bearing on the question of the maintenance of grades of cotton for the highest class of spinning in this country.

STATEMENT OF RECEIPTS AND PAYMENTS				EXPENDITURE			
RECEIPTS		EXPENDITURE		Rs		Rs	

BALANCE SHEET AS ON MARCH 31ST, 1927.

RECEIPTS FROM MARCH 1923.			EXPENDITURE FROM APRIL 1923.		
	Rs.	a. p.		Rs.	a. p.
Cotton Cess Receipts	..	47,55,807 8 3	I. Administration and Improvement of cotton marketing		
Interest Account	..	2,66,558 11 0	II. Technological Research.		
Profit on conversion of 6% 1926 Bonds	..	5,000 0 0	(a) Capital Expenditure—		
Miscellaneous Receipts	..	3,283 15 11	1. Land and Buildings	3,55,299 9 11	
Suspense Receipts	..	22 8 0	2. Machinery	91,676 11 2	5,24,831 12 7
Provident Fund Account	..	30,739 12 10	3. Apparatus and Equipment	41,558 3 7	
			(b) Working Expenses	3,41,707 0 3	8,30,241 8 11
			III. Research Studentships		85,947 12 9
			Agricultural Research Grants—		
			IV. Bombay	2,09,616 8 0	
			V. Madras	38,980 0 0	
			VI. Punjab Botanical Scheme	99,442 15 8	
			Punjab Entomological Scheme	20,600 0 0	
			VII. Central Provinces	86,996 12 6	
			VIII. United Provinces	63,814 14 0	
			IX. Indore	4,71,343 12 0	
			X. Sind .. ..	.....
			XI. Burma	2,736 8 5	
			Total Expenditure	9,93,531 6 7	
			Suspense Account	24,34,552 8 10	
			Investments and Cash Balances	10,144 9 7	
			Total	26,16,715 5 7	
				50,61,412 8 0	

APPENDIX XIII.

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STATEMENT SHOWING EXPENDITURE UNDER RESEARCH SCHEMES UP TO MARCH 31ST 197

STATEMENT SHOWING EXPENDITURE UNDER RESEARCH							
Major Heads	Total Expenditure up to March 31st 1927	Expenditure from Capital grants on			Expenditure from annual grants on apparatus and equipment of a permanent or semi permanent nature	Net working expenses i.e. staff field experiments labour stores laboratory and field continuation of researches including petty apparatus	
		(a) Land and Buildings	(b) Machinery and Apparatus and other movable property			Rs	a p
	Rs	a	p	Rs	a	p	
II Technological Research	8 30 24	15		3 55	09 9 11	1 33 23	14 9
IV <i>Boy's Schemes</i> —							
(1) Surat Physiological	81 170	0	0			12 968	14 11
(2) Surat Boll worm	56 608	6	0			4 226	7 2
(3) Dharwar Wilt and Cotton Breeding	69 450	10	0			9 374	10 4
(4) Khandesh Cotton Breeding	— 387	5	0			— 639	0 9
V <i>Madras Schemes</i> —	38 080	0	0				
(a) Herbaceous Scheme							
(b) Pemphercs and Physio logical Research Scheme							
VI <i>Punjab Schemes</i> —	99 447	15	0	22 210	0 0	1 908	10 0
(1) Botanical Scheme	— 0 600	0	0			369	6 0
(2) Entomological Scheme	86 996	12	6			7 432	14 10
Central Provinces	63 814	14	0			1 227	1 3
VIII United Provinces	4 71 343	12	0	* 1 89 600	0 0	* 23 301	9 11
IX Indore							
X Sind	— 736	8	5			2 736	8 5
XI Burma	85 947	12	9				
Research Studentships	19 09 720	11	7	5 67 109	9 11	74 114	8 2
Total				~ 23 653	10 1	10 44 84	15 5
Returns for 1926 27 not yet received							
Summary							
Capital Grants (a) Land and Buildings						Rs	a p
(b) Machinery apparatus and other movable property						5 67 635	9 11
Apparatus and equipments of a permanent or semi permanent nature purchased from annual grants						2 105	9 2
						72 205	14 2
Total Rs						4 62 007	1 3

* Figures for 1926 27 taken from budget and subject to revision on receipt of final accounts

Rs a p

5 67 635 9 11

2 105 9 2

72 205 14 2

5 62 007 1 3

APPENDIX XIV.

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL COTTON COMMITTEE'S RESEARCH GRANTS.

TECHNOLOGICAL RESEARCH LABORATORY.

1.	Director, Technological Research Laboratory, Bombay.	Mr. A. James Turner, M.A. (Cantab.), 1st Class in Tripos and in Part II, B.Sc. (London).	Recently Professor of Textile Physics, Manchester College of Technology.
2.	Spinning Master, Spinning Laboratory, Matunga (Bombay).	Mr. R. P. Richardson, London City and Guilds Full Honours Certificate.	—
3.	Senior Research Assistant (Chemist), Technological Laboratory, Matunga, Bombay.	Mr. D. L. Sen, M.Sc. Tech. (Manch.), M.Sc., A.I.I.Sc., A.I.C.	Recently Research Student at the Indian Institute of Science and Manchester College of Technology.
4.	Junior Research Assistant (Microscopist), Technological Laboratory, Matunga, Bombay.	Mr. H. N. Dutt, B.Sc., M.B.	Recently Demonstrator in Botany, Gujerat College.
5.	Junior Research Assistant (Microscopist), Technological Laboratory, Matunga, Bombay.	Mr. Amarnath Gulati, M.Sc.	—
6.	Junior Research Assistant (Physicist) . .	Mr. N. Hari Rao, M.Sc. (1st Class First), Calcutta University.	Indian Central Cotton Committee's Research Scholar (Textile Physics).
7.	Junior Research Assistant (Physicist) . .	Mr. Ram Saran Koshal, M.Sc.	Indian Central Cotton Committee's Research Scholar (Textile Physics).
8.	Statistical Assistant	Mr. V. Venkataraman, M.A. (Madras), 1st Class Honours in Maths.	Recently Statistical Assistant in Labour Office, Bombay.
9.	Electrician	Mr. K. S. Venkatraman, Government Techni- cal Board Examination, 1921.	Bombay Electric Supply and Trans- ways Co.
10.	Junior Tester	Mr. S. S. Sukhtankar, Licentiate, V.J.T.I. . .	—
11.	Junior Tester	Mr. K. G. Deo, passed Examination in Arts, Bombay.	—
12.	Junior Tester	Mr. H. B. B. Joshi, B.Sc.	—

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL COTTON COMMITTEE'S RESEARCH GRANTS—*contd*

13	Junior Tester	Mr K S Marar B A	—
14	Junior Tester	Mr H R Nayak Inter Science (Madras)	—
15	Junior Tester	Mr R G Panvalkar B Sc	—
16	Junior Tester	Mr G D Bhde B Sc	—
17	Junior Tester	Mr K V N Nayyar	—
18	Junior Tester	Mr V N Modak B Sc	—
19	Junior Tester	Mr L V Sundaraman B A	—
20	Junior Tester	Mr P S Sambamurthi	—
21	Junior Tester	Mr G J Kharkar B Sc	—
22	Spinning Assistant	Mr N Iyengar	—

INSTITUTE OF PLANT INDUSTRY INDORE

31	Director Institute of Plant Industry Indore	Mr A Howard C I E M A (Cantab)	Recently Imperial Economic Botanist
34	Physiological Botanist	Mrs G L C Howard M A (Dublin)	Recently and Imperial Economic Botanist
25	Chief Assistant in Agricultural Chemistry	Dr R D Rege Ph D M Sc B A	—
6	Assistant in charge of Field Experiments Seed Farm	Mr K R Joshi L Ag (Nagpur)	—
	Personal Assistant	Mr M Sri Lal Saksena L Ag	Lent by Indore State Agricultural Department
	Junior Assistant	Mr G C Tambe B Ag (Bombay)	
	Junior Assistant	Mr Kuber Singh B Ag (Bombay)	

APPENDIX XIV.

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL COTTON COMMITTEE'S RESEARCH GRANTS.

TECHNOLOGICAL RESEARCH LABORATORY.

1.	Director, Technological Research Laboratory, Bombay.	Mr. A. James Turner, M.A. (Cantab.), 1st Class in Tripos and in Part II, B.Sc. (London).	Recently Professor of Textile Physics, Manchester College of Technology.
2.	Spinning Master, Spinning Laboratory, Matunga (Bombay).	Mr. R. P. Richardson, London City and Guilds Full Honours Certificate.	—
3.	Senior Research Assistant (Chemist), Technological Laboratory, Matunga, Bombay.	Mr. D. L. Sen, M.Sc. Tech. (Manch.), M.Sc., A.I.I.Sc., A.I.C.	Recently Research Student at the Indian Institute of Science and Manchester College of Technology.
4.	Junior Research Assistant (Microscopist), Technological Laboratory, Matunga, Bombay.	Mr. H. N. Dutt, B.Sc., M.B.	Recently Demonstrator in Botany, Gujarat College.
5.	Junior Research Assistant (Microscopist), Technological Laboratory, Matunga, Bombay.	Mr. Amarnath Gulati, M.Sc.	—
6.	Junior Research Assistant (Physicist) . .	Mr. N. Hari Rao, M.Sc. (1st Class First), Calcutta University.	Indian Central Cotton Committee's Research Scholar (Textile Physics).
7.	Junior Research Assistant (Physicist) . .	Mr. Ram Saran Koshal, M.Sc.	Indian Central Cotton Committee's Research Scholar (Textile Physics).
8.	Statistical Assistant	Mr. V. Venkataraman, M.A. (Madras), 1st Class Honours in Maths.	Recently Statistical Assistant in Labour Office, Bombay.
9.	Electrician	Mr. K. S. Venkatraman, Government Techni- cal Board Examination, 1921.	Bombay Electric Supply and Tram- ways Co.
10.	Junior Tester	Mr. S. S. Sukhtankar, Licentiate, V.J.T.I. . .	—
11.	Junior Tester	Mr. K. G. Deo, passed Examination in Arts, Bombay.	—
12.	Junior Tester	Mr. H. B. B. Joshi, B.Sc.	—

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL
COTTON COMMITTEE'S RESEARCH GRANTS—*contd*

13	Junior Tester	Mr K S Marar B A	—
14	Junior Tester	Mr H R Nayak Inter Sc enca. (Madras)	—
15	Junior Tester	Mr R G Panwalkar B Sc	—
16	Junior Tester	Mr G D Bhade B Sc	—
17	Junior Tester	Mr K V N Nayar	—
18	Junior Tester	Mr V N Modak B Sc	—
19	Junior Tester	Mr L V Sundaraman B A	—
20	Junior Tester	Mr P S Sambamurthi	—
21	Junior Tester	Mr G J Kharikar B Sc	—
22	Spinning Assistant	Mr N Iyengar	—

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INSTITUTE OF PLANT INDUSTRY INDORE

23	Director Institute of Plant Industry Indore	Mr A Howard C I E, M A (Cantab)	Recently Imperial Economic Botanist
24	Physiological Botanist	Mrs G L C Howard M A (Dublin)	Recently and Imperial Economic Botanist
25	Chief Assistant in Agricultural Chemistry	Dr R D Rege Ph D M Sc B A	—
26	Assistant in charge of Field Experiments Seed Farm	Mr K R Joshi L Ag (Nagpur)	Lent by Indore State Agricultural Department
27	Personal Assistant	Mr Misra Lal Saksena L Ag	—
28	Junior Assistant	Mr G C Tambe B Ag. (Bombay)	—
29	Junior Assistant	Mr Kuber Singh B Ag (Bombay)	—

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL,
COTTON COMMITTEE'S RESEARCH GRANTS—*contd.*

30.	Senior Fieldman ..	..	Mr. Nihal Singh	..	..	..	—
31.	Junior Fieldman ..	..	Mr. V. R. Sathe	..	..	..	—
32.	Junior Fieldman ..	..	Mr. Yakub Ali ..	..	..	..	—

BOMBAY RESEARCH SCHEMES.							
(i) <i>Physiological.</i>							
33.	Botanist in charge of Cotton Research Scheme No. 1—Physiology of the Cotton Plant in Gujerat.	..	Mr. K. V. Joshi, M.Ag. (Bombay)	..	..	On deputation from Bombay Department of Agriculture.	
34.	Senior Research Assistant	..	Mr. S. V. Godbole, M.Sc., B.Ag.	..	..	—
35.	Junior Research Assistant	..	Mr. A. K. Shah, B.Ag. (Bombay)	..	..	—
36.	Junior Research Assistant	..	Mr. N. M. Nitimargi, B.Ag. (Bombay)	..	..	On deputation from Bombay Department of Agriculture.	
37.	Junior Research Assistant	..	Mr. R. B. Gode, M.Sc.	..	..	..

(ii) <i>Mycological.</i>							
38.	Cotton Mycologist, Dharwar	..	Mr. G. S. Kulkarni, M.Ag. (Bombay)	..	..	Assistant Professor of Mycology, Poona Agricultural College—on deputation.	
39.	Senior Assistant to the Cotton Mycologist.	..	Mr. B. B. Mundkur, M.A. (Madras), 1st Class Honours in Botany and Gold Medallist.	..	..	—
40.	Junior Graduate Assistant, Dharwar	..	Mr. R. K. Kulkarni, B.Ag. (Bombay)	..	..	On deputation from Bombay Department of Agriculture.	
41.	Junior Graduate Assistant, Dharwar	..	Mr. T. R. Khadilker B.Ag., (Bombay) (with advanced Botany).	..	..	..

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL COTTON COMMITTEE'S RESEARCH GRANTS—*contd.*

BOMBAY RESEARCH SCHEMES —*concl'd.*

(iii) *Entomological*

	Cotton Entomologist, Spotted Boll worms Investigation	Mr. Ramrao S. Kasargode, L. Ag. (Bombay).	Assistant Professor of Entomology, Agricultural College, Poona—on deputation
42.			
43.	Research Assistant	Mr. B. P. Deshpande, B. Ag. (Bombay). 1st Class	On deputation from Bombay Department of Agriculture
44.	Research Assistant	Mr. S. G. Kadkol, B. Ag. (Bombay). ..	"
45.	Research Assistant	Mr. N. T. Nadkarni, B. Ag. (Bombay) ..	"

(iv) *Khandesh Cotton Breeding Scheme.*

		Mr. R. C. Pendse, B. Ag. ..	On deputation from Bombay Department of Agriculture.
46.	Graduate Assistant		
47.	Graduate Assistant	Mr. Y. D. Yardi, B. Ag. ..	"
48.	Technician	Mr. R. A. Rao ..	"

(v) *Sind Research Scheme.*

		Mr. H. M. Durrani, M. Sc. in Botany, 1st Class (Research), Malaviya Gold Medalist.	Research Student, Indian Central Cotton Committee.
49.	Cotton Specialist		
50.	Junior Assistant	Mr. V. D. Wani, M. A., M. Sc. (Bombay) ..	"
51.	Junior Assistant	Mr. Kusum M. Kanji, Dip. in Ag. (Bombay)	"
52.	Junior Assistant		"

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL
COTTON COMMITTEE'S RESEARCH GRANTS—*contd.*

CENTRAL PROVINCES RESEARCH SCHEME.

(i) *Botanical.*

53.	Second Economic Botanist	..	Mr. D. N. Mahta, B.A., F.L.S.	—	
54.	1st Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. S. C. Roy, L.Ag., and Post Graduate, Pusa.	On deputation from Central Agricultural Department.	Central Provinces
55.	2nd Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. D. G. Sawargaonkar, L. Ag. (Hons.)	..	On deputation from Central Agricultural Department. Central Provinces
56.	3rd Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. D. L. Janoria, L.Ag. (Hons.)	..	On deputation from Central Agricultural Department. Central Provinces
57.	4th Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. D. Y. Bhand, L.Ag. (Hons.)	..	On deputation from Central Agricultural Department. Central Provinces
58.	5th Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. S. S. Pande, M. Sc.	..	On deputation from Central Agricultural Department. Central Provinces
59.	6th Assistant to Economic Botanist for Cotton, Central Provinces.	..	Mr. E. Das Gupta, B.Sc. L.Ag.	..	Research Student, Indian Central Cotton Committee. Central Provinces

(ii) *Mycological.*

60.	Senior Mycological Assistant	..	Mr. Jiwan Singh, M.Sc., 1923.	..	Research Student, Indian Central Cotton Committee.
61.	Junior Mycological Assistant	..	Mr. A. N. Paranjape, B.Sc.	..	—
62.	Herbaceum Cotton Investigator	..	MADRAS HERBACEUM SCHEME.		
63.	Technical Assistant	..	Mr. R. Chockalingam Pillai, L.Ag.	..	On deputation from Madras Department of Agriculture.
64.	Technical Assistant	..	Mr. S. N. Venkataraman, B.A., B.Sc.	..	..
		..	Mr. P. Abraham, B.A. (1st Class)	..	..

LIST OF SCIENTIFIC AND TECHNICAL OFFICERS PAID FROM THE INDIAN CENTRAL COTTON COMMITTEE'S RESEARCH GRANTS—*contd.*

MADRAS HERBACEUM SCHEME—*contd.*

65.	Technical Assistant	..	..	Mr. G Seshadri Ayyangar, M A.	..	..	—
66.	Technical Assistant	..	..	Mr. D Devasirvatham, Govt. Tech Exam	..	..	On deputation from Madras Department of Agriculture.
67.	Technical Assistant	..	..	Mr S Gnanapragasam	..	..	"

PUNJAB RESEARCH SCHEME.

(i) *Botanical.*

68.	Cotton Research Botanist	.	.	Mr Trevor Trought, M A (Cantab)	.	.	Recently Senior Botanist to the Ministry of Agriculture, Egypt.
69	Technical Assistant	..	..	Chaudhri Mohd Akbar, L Ag.	..	..	On deputation from the Punjab Department of Agriculture
70.	Technical Assistant	.	.	Mr Akbar Ali, B Sc.	..	..	Research Student, Indian Central Cotton Committee
71.	Technical Assistant	.	..	Bh Sarup Singh, L Ag	.	..	On deputation from the Punjab Department of Agriculture.
72.	Technical Assistant			Chandhri Mohd Rashid	..	..	"

(ii) *Entomological.*

73.	Assistant Entomologist			Mr Sohan Singh Bindra, M Sc.	..	..	Research Student, Indian Central Cotton Committee
74.	Field Assistant	.	.	Mr Ladha Ram	..	..	—
75.	Field Assistant	..	..	Mr Mool Chand	..	..	—
76.	Field Assistant	..	..	Mr. Mushtaq Ali	..	..	—
77.	Statistical Assistant	..	..	Mr Rishi Kesh	..	..	—

UNITED PROVINCES RESEARCH SCHEME

78.	Assistant Entomologist, Pink Boll worm Investigation,	Mr. H D Nangpal, B Sc., Honours School, Punjab.	Research Student, Indian Central Cotton Committee.
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APPENDIX XV. LIST OF RESEARCH STUDENTS.

Year of appointment.	Name.	Where posted on appointment.	Branch of cotton research in which scholarship granted.	How now employed.	Remarks.
1923	Sohan Singh Bindra, M.Sc., Honours School (Punjab).	Lyallpur ..	Cotton Entomology ..	Assistant Entomologist, Lyallpur. Pink Boll- worm Research Scheme.	Indian Central Cotton Committee.
"	Mohammed Afzal, (Punjab).	B.Sc. Lyallpur ..	Cotton Botany (Plant Breeding).	Punjab Government Scholar at Imperial College of Tropical Agriculture, Trinidad.	.....
"	Sheo Shanker Pande, M.Sc. (Punjab).	Nagpur ..	Do.	Senior Research Assistant, Central Provinces Ba- tanical Research Scheme.	Indian Central Cotton Committee.
"	Jiwan Singh, M.Sc. (Punjab).	Do. ..	Cotton Mycology ..	Senior Mycological As- sistant, Central Provinces Wilt Investigation Scheme.	Indian Central Cotton Committee.
"	Ilabonto Banerji, M.Sc. (Cal- cutta).	Coimbatore ..	Cotton Botany	Senior Research Student (Cotton Cytology), Indore Institute of Plant In- dustry.	Indian Central Cotton Committee.
"	B. B. Desai, B.Ag. (Bom.)	Dharwar ..	Do.	Cotton Breeder, Sind ..	(Bombay Agricultural Service).
1924	Atul Chandra Dutta, M.Sc. (Calcutta).	Coimbatore ..	Do.	(No record.)	.....
"	N. Hari Rao, M.Sc. (Calcutta).	Technological Re- search Labo- ratory, Matunga, Bombay.	Textile Physics	Research Assistant, Tech- nological Research Labo- ratory, Matunga, Bom- bay. (Junior Physicist.)	Indian Central Cotton Committee.
"	H. D. Nangpal, B.Sc., Honours School (Punjab).	Cawnpore ..	Cotton Entomology	Assistant Entomologist, Pink Boll-worm in- vestigation, United Pro- vinces.	Indian Central Cotton Committee.
"	Sant Bahadur Singh, M.Sc. (Benares Hindu University)	Surat ..	Cotton Physiology.	Resigned to go to Cam- bridge for further study. Obtained ph.D.

LIST OF RESEARCH STUDENTS—contd

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Year of appointment.	Name	Where posted on appointment	Branch of cotton research in which scholarship granted	How now employed	REMARKS
1925	Vishwa Ram Singh L Ag (Agricultural College Cawnpore)	Cawnpore	Cotton Entomology	Research Student	Studentship extended
.	Akbar Ali B Sc (Punjab)	Lyalpur	Cotton Botany (Plant Breeding)	Technical Assistant to Cotton Research Dept Punjab	Indian Central Cotton Committee
.	Milur Nath Trehan M Sc (Punjab)	Do	Cotton Entomology	Assistant Entomological Subordinate Punjab Agricultural Service	Studentship extended
.	S E Kumana, B A, B Sc (Bombay)	Technological Laboratory, Matunga Bombay	Cotton Technology	Research Student	Studentship extended
.	J D Randeive B Ag (Bombay)	Dharwar	Cotton Physiology	Do	Do
.	P K Roy, M Sc (Dacca)	Technological Laboratory, Matunga Bombay	Textile Physics	Resigned in 1925	Studentship extended.
.	K R Sen M Sc (Dacca)	Do	Do	Research Student	Studentship extended.
.	L N Rao M Sc (Calcutta)	Do	Cotton Microscopy	Lecturer in Botany Central College Bangalore	Selected for appointment of Assistant Technologist Technical Laboratory
1926	D F Kapadia B A B Sc (Tech Manchester)	Do	Cotton Technology	Research Student	Indian Central Cotton Committee
.	Ram Saran Koshal M Sc (Punjab)	Do	Textile Physics	Research Assistant Technological Laboratory (Junior Physicist)	
.	M A Shama Iyengar B Ag (Bombay)	Burat	Cotton Physiology	Research Student	
.	Karim Singh Lamba B Sc Honours School (Punjab)	Lyalpur	Cotton Entomology	Resigned from July 1st 1927	

LIST OF RESEARCH STUDENTS—*contd.*

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Year of appointment.	Name.	Where posted on appointment.	Branch of cotton research in which scholarship granted.	How now employed.	REMARKS.
1926	Y. D. Wad, M.A., M.Sc. (Bombay).	Coimbatore..	Cotton Bio-chemistry.	Research Student..	} Still under training.
"	H. A. Idnani, B.Ag. (Bombay).	Institute of Plant Industry, Indore.	Cotton Botany	Do.	
"	S. C. Talesara, B.Ag. (Bombay).	Do.	Do.	Do.	
1927.	Iyengar, R. Lakshminarasimha, B.Sc. (Mysore).	Technological Laboratory, Matunga.	Cotton Technology	Research Student..	} Still under training.
"	Thakur, Anant Krishna, M.Sc. (Bombay).	Do.	Cotton Bio-chemistry.	Do.	
"	Dev Raj Mehta, B.Sc. Honours School (Punjab).	Lyallpur	Cotton Entomology.	Do.	
"	Uma Shankar, M.Sc. (Allahabad).	Cawnpore	Do.	Do.	} Still under training.
"	Rane, Shripad Shamrao, M.Sc. (Benares Hindu University).	Indore	Cotton Physiology.	Do.	
"	Varna, Sant Singh, M.Sc. (Benares Hindu University).	Dharwar	Cotton Physiology in connection with Cotton Wilt Investigation.	Do.	
"	Mathur, Lakshmi Narayan, M.Sc. (Punjab).	Indore	Cotton Breeding	Do.	} Still under training.
"	Kadaba Rangaswamy, M.Sc. (Calcutta).	Coimbatore..	Do.	Do.	
"	S. Shamsheer Singh, M.Sc. (Punjab).	Indore	Cotton Agronomy..	Do.	
34 Total.					

" Indian Central Cotton Committee " in the Remarks column indicates a post paid for from one of the Committee's Research Grants.

